THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XXI. No. 506—24TH YEAR.] LONDON, FEBRUARY 27, 1872. [Subscription per Annum. 15s. in Advance. 18s. Credit.] DOUBLE No. Price 1s.

RAMSAY'S NEWCASTLE CANNEL COAL. Analysis—10,000 cubic feet of gas per ton of coal; 26-candle gas; 13¼ cwt. coke per ton of coal.
RAMSAY'S PATENT CONDENSED COKE.
DO. GARESFIELD COKE.

RAMSAY'S FIRE-CLAY ARTICLES.

GAS-RETORTS, introduced 1828. FIRE-BRICK WORKS, established 1804. FIRE-CLAY SANITARY PIPES, CHIMNEY-TOPS, and all Goods made of Fire-Clay. The Fire-Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article. The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the Works are the most extensive in the Kingdom.
Manufactories—Derwenthaugh, Swalwell, and Hebburn Quay, near Newcastle-on-Tyne; and London Wharves—Falcon Wharf, No. 80, Bankside; and Honduras Wharf, Cubitt Town. Large stocks kept.
Address G. H. RAMSAY, NEWCASTLE-ON-TYNE.

GEORGE GLOVER & CO.,

Patentees of the Standard Gasometers for the Government, and of the

IMPROVED DRY GAS-METERS.

These Meters are warranted to measure correctly and not to vary. Their acknowledged superiority has brought them into general use more rapidly than any Meters hitherto manufactured.

To meet the increasing demand, G. GLOVER AND CO. have just entered on possession of extensive premises adjoining their present Works in Ranelagh Road, and they are now prepared to execute promptly, orders to any extent. They keep in stock all sizes of Meters up to 200 lights. In cases of haste, on the receipt of a telegram early on one day, their Meters can be delivered next day in any part of England, and in the large towns in Scotland.

Particulars and lists of prices forwarded on application to—

RANELAGH ROAD, PIMLICO, LONDON, S.W.;
236, GEORGE STREET, GLASGOW;
OR
15, MARKET STREET, MANCHESTER.

COWEN'S PATENT FIRE-CLAY RETORTS.

JOSEPH COWEN and CO.,

BLAYDON BURN, NEAR NEWCASTLE-ON-TYNE,

Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS-RETORTS and other OBJECTS in FIRE-CLAY," and they have also been awarded in the INTERNATIONAL EXHIBITION of 1862, the PRIZE MEDAL for "GAS-RETORTS, FIRE-BRICKS, &c., for EXCELLENCE of QUALITY."

J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts in the United Kingdom; and orders for Fire-Clay Retorts of all shapes and dimensions, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.

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Coal Office,
QUAY SIDE, NEWCASTLE-ON-TYNE.

JOHN RUSSELL AND CO.,

THE OLD TUBE-WORKS, WEDNESBURY;
AND
THE ALMA WORKS, WALSALL.
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5, CHARLES STREET, SOHO; and
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35, 36, 37, & 39, GRANBY ROW, MANCHESTER.

J. R. and Co. are the original manufacturers of Wrought-Iron Gas Tubes and Fittings, and Inventors of the LAP-WELDED TUBES for Locomotive and Marine Boilers.
J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water; Gun-Metal Cocks, Stocks, and Dies; Galvanized Tubes and High-Pressure Tubes, &c.
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WET AND DRY GAS-METER
AND
STREET-LAMP
MANUFACTURERS,
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All materials found for the alteration of Public Lamps for lighting with the Rod. Regulators with Lava Burners.

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NEAR NEWCASTLE-ON-TYNE.

WILLIAM COCHRAN CARR begs most respectfully to thank the Metropolitan, Provincial, and Continental Gas Companies for their patronage for several years past, and to intimate that he has rebuilt and enlarged his extensive premises for the manufacture of CLAY RETORTS; and that he is now prepared to execute the largest orders with punctuality and despatch. Orders for FIRE-CLAY RETORTS, of all shapes and sizes, FIRE-BRICKS, and all other articles in Fire-Clay, executed on the shortest notice, and on the most reasonable terms.
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J. & W. ROMANS, Consulting Gas Engineers and Coal Factors, of Edinburgh and London, CONTRACT for supplying any quantity of COAL and CANNEL.
They are also Contractors for leasing Gas-Works, for supplying, erecting, or repairing gas apparatus and fire-clay goods.
Messrs. ROMANS, being lessees of several Gas-Works, have their Cannels tested in the ordinary working process, thus securing for their customers a guarantee beyond mere laboratory experiments.
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Coal, machinery, fire goods, &c., shipped to all parts of the world.

LESMAHAGO GAS COAL,

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HAVE OBTAINED THE

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PRIZE

FOR

SILVER MEDAL,

PARIS, 1867.

IMPROVED DRY GAS-METERS AND GASOMETERS,

AT THE

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FOR GAS, STEAM, AND WATER;

Also ORDINARY WELDED WROUGHT-IRON TUBES and FITTINGS,

FOR GAS, STEAM, & WATER, EITHER BLACK, GALVANIZED, OR ENAMELLED.

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For Gas, Steam, Water, &c.

SOLE LICENSEES AND MANUFACTURERS for the United Kingdom of

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LAP-WELDED IRON & HOMOGENEOUS METAL TUBES

For Locomotive, Marine, and Stationary Boilers.

Boiler-Tube Ferrules, Gun-Metal Gland Cocks, Water-Gauges, Whistles, &c.; Stocks, Taps, and Dies for Screwing, and Gas-Fitters Tools of all kinds.

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PROPRIETORS OF

BEST GLASS-HOUSE POT & CRUCIBLE CLAY;

MANUFACTURERS OF

GLASS-HOUSE POTS, CRUCIBLES, GAS-RETORTS, & FIRE-BRICKS OF EVERY DESCRIPTION.

WILLIAM INGHAM AND SONS,

WORTLEY FIRE-BRICK AND RETORT WORKS,

Near

Leeds.

W. INGHAM and SONS, having for many years been extensively engaged in the Manufacture of

RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY,

beg to call especial attention to their RETORTS, which have for many seasons proved to be unsurpassed in quality by any in the Kingdom, their FREEDOM FROM CRACKS and the ADHESION OF CARBON rendering them worthy the attention of all parties interested in the making of Gas.

The Works are of such magnitude as to ensure the prompt execution of orders to any extent.

Estimates for Setting, or Bricklayers sent when required.

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A large Stock of Fire-Bricks, Fire-Clay, Terra Cotta, and Drain-Pipes of all Sizes kept in London at Mr. ALFRED WILLIAMS, Wharf, 64, Bankside, Southwark, where all particulars of Prices, &c., may be obtained.

N.B.—*Export orders continue to have prompt attention.*

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The only Prize Medal awarded for TUBES & FITTINGS.

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ONLY MAKERS OF HOMOGENEOUS METAL TUBES.

MANUFACTURERS OF

TUBES and FITTINGS for GAS, STEAM, and WATER;

LAP-WELDED, LOCOMOTIVE, MARINE, and other BOILER TUBES;

HYDRAULIC TUBES, BEDSTEAD TUBES, WELL TUBES, TELEGRAPH POSTS, COILS, &c.;

GAS-FITTERS TOOLS, VALVES, COCKS, &c.

THOMAS PIGGOTT & CO.,

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PURIFIERS, CONDENSERS, SCRUBBERS, RETORTS, VALVES;

IMPROVED WROUGHT-IRON RETORT-LIDS, CROSS-BARS, & SCREWS;

AND GAS APPARATUS OF EVERY DESCRIPTION.

SOLE MANUFACTURERS OF LIVESEY'S PATENT GASHOLDER MAN-LID,

By use of which Man-lid, inlet and outlet pipes can be examined and cleansed without loss of gas in crown of holder, or ingress of atmospheric air.

ROOFS, GIRDERS, BRIDGES, AND BOILERS OF ALL KINDS.

Drawings, Specifications, and Estimates supplied on application.

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SOLE MAKERS OF

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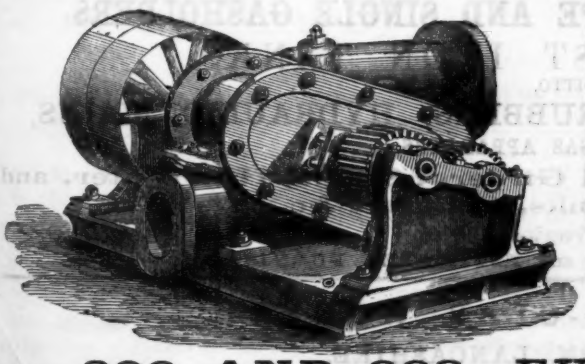
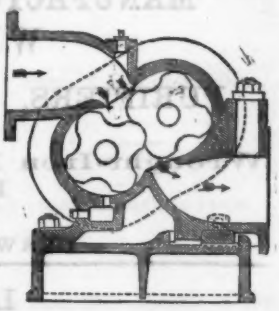


The very best Pump yet introduced for pumping in gas-works, tanneries, distilleries, breweries, water and sewage works, paper-mills, sugar-houses, starch and chemical works, for draining quarries and irrigating land, filling tanks at railway stations, factories, towns, mansions, ships, and dockyards.

In use at several of the largest gas-works in London.

For testimonials and particulars, apply at

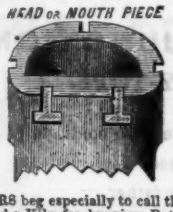
Diameter of Pipes, Suction and Delivery.	Gallons raised per Hour.
Inches.	
2	2,000
2½	3,000
3	4,500
4	7,500
5	12,500
6	18,000
7	24,000
8	31,000
9	40,000
10	49,000
11	59,000
12	71,000
14	96,000
15	110,000
16	125,000
18	160,000



366 AND 368, EUSTON ROAD, N.W.

KING BROTHERS,

STOURBRIDGE FIRE-BRICK AND RETORT WORKS.



KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them FREE FROM CRACKS AND CORRECT IN FORM. By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

Retort Ovens, Fire-Bricks, Guards, Saddles, Rabbitted Burs, Flues, and Quarries, are all Manufactured of the same quality of Clay.

Every Retort and Brick is branded "King Brothers, Stourbridge."

Agent in Ireland—Mr. JAMES FURNESS, DOCTOR GARDENER STREET, DUBLIN.

THE FARNLEY IRON COMPANY, LIMITED,

FARNLEY, near LEEDS,

Possess special advantages for the prompt and efficient execution of large orders for

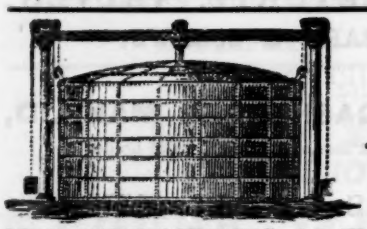
FIRE-CLAY RETORTS & FIRE-BRICKS,

Of every shape and size, and of the best quality; also for their *other productions* in Fire-Clay and Terra-Cotta, including their well-known White and Coloured GLAZED BRICKS.

The F. I. Co. have the exclusive right to make and sell Fraser's Patent "Ribbed" Retorts in Fire-Clay.

Apply as above, or at their Offices,

3, WESTMINSTER CHAMBERS, VICTORIA STREET, S.W., or at 46½, QUEEN STREET, HULL.



IMPROVED GAS APPARATUS,

FOR CITIES, TOWNS, VILLAGES, &c.,

INVENTED AND MANUFACTURED BY

W. C. HOLMES & CO.,

WHITESTONE IRON-WORKS, HUDDERSFIELD.

SOLE MANUFACTURERS of B. W. THURSTON'S IMPROVED SCRUBBER, CONDENSER, and WASHER, in use in many of the principal Gas-Works on the Continent.

PATENTEES of the IMPROVED COMBINED PURIFYING APPARATUS, so eminently adapted for Exportation.

ESTIMATES, PLANS, and SPECIFICATIONS PREPARED for BUILDINGS and APPARATUS.

Prospectus, Price Lists, &c., on application.

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REFERENCES TO NEARLY 300 GAS-WORKS.

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WOOD SIEVES FOR PURIFIERS

Have now been in use for more than ten years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.

Midland Iron-Works, Donnington, near Newport, Shropshire; 8, Finsbury Circus, London.

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Successor to the late BENJAMIN WHITEHOUSE,

(ESTABLISHED IN 1765,)

BOILER AND GASHOLDER WORKS,

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MANUFACTURER OF TELESCOPE AND SINGLE GASHOLDERS,

WROUGHT & CAST IRON TANKS

FOR DITTO,

PURIFIERS, CONDENSERS, SCRUBBERS, HYDRAULIC MAINS,

And all kinds of GAS APPARATUS.

Wrought-Iron Roofs, Bridges, and Girders; Steam, Hot Water, and Range Boilers; Tanks, Cisterns, &c.,

And all kinds of Wrought-Iron Work.

DRAWINGS, SPECIFICATIONS, and ESTIMATES FURNISHED.

LIVESEY FIRE-CLAY WORKS,

NEAR BLACKBURN, LANCASHIRE.

(ESTABLISHED 1835.)

ORLANDO BROTHERS,

MANUFACTURER OF PATENT CLAY RETORTS,

AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.

FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

As Trustees of the late ORLANDO BROTHERS, we most respectfully announce that we intend to continue the above business under the name of ORLANDO BROTHERS, in which name all communications must be addressed.

We trust that we shall receive a continuance of the same support which was given to our late father.

We are, yours most respectfully,

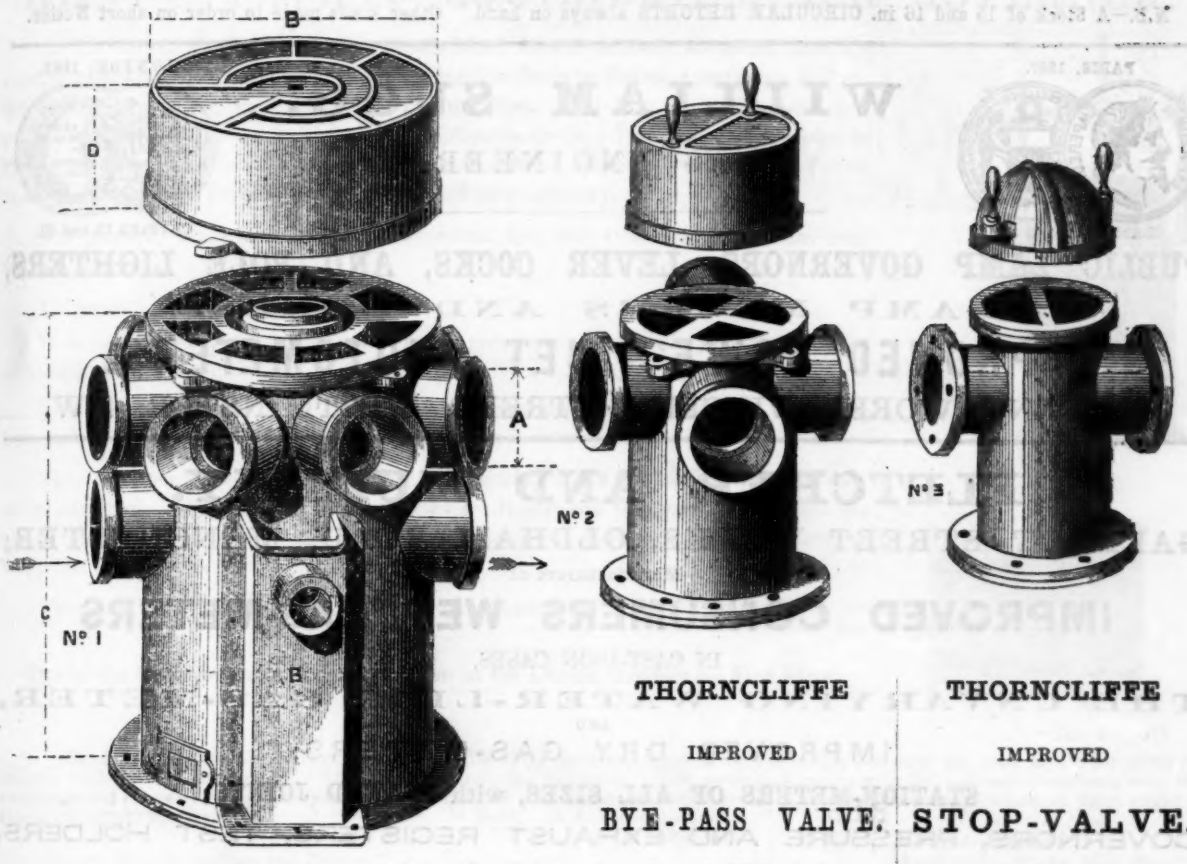
ORLANDO BROTHERS.
FRANCIS W. BROTHERS.
COLIN BROTHERS.

THE THORNCLIFFE IMPROVED CENTRE-VALVE,

MANUFACTURED BY

MESSRS. NEWTON, CHAMBERS, & CO.

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD.



THORNCLIFFE IMPROVED BYE-PASS VALVE.

SIZES

From 3 ins. upwards.

THORNCLIFFE IMPROVED STOP-VALVE.

SIZES

From 3 ins. upwards.

Sizes of the THORNCLIFFE IMPROVED CENTRE-VALVE.

		Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
A	Bore of Pipe...	4	5	6	7	8	9	10	12
B	Diam. of Body.	16	20	23	26	28	31	34	40
C	Height of Tank.	33	35	38	43	46	48	51	56
D	Depth of Cover.	8	9	10	11	12	13	14	16
	Total height...	41	44	48	54	58	61	65	72

In all cases the Covers are cast heavy enough to resist any required pressure.

The advantages derived from the adoption of these Valves are so manifest and cardinal that in the immediate character of the change—the simplicity of the machine—the facility affording for cleaning out connexions between Valve and Purifier—the perfect collection and delivery by suitable overflow of the ammonia, at a greatly diminished depth from ground-line over the old form of Valve—the advantage of connecting on the same level, and at any angle, or opposite to each other, the inlet and outlet pipes without dip or rise—the clear acquisition of space in the purifying-house, by being able to place the boxes nearer together, the new Valve being entirely under the floor—and lastly, though of the greatest importance, the passage of crude and unpurified gas during the change is minimized to the merest fraction, thus preventing the fouling by impure gas the delicate machinery and easily affected exposed movements of the station-meter, thereby preventing the introduction of the enemy (unpurified gas) into the gasholder. Also a dead abutment is offered to all back pressure, imparting thereby to the gauges, governors, and hydraulic seals, a steadiness of action never realized with the once famous, but now fast becoming obsolete, Hydraulic Centre-Valve.

N., C., and Co. also Manufacture and Erect

PURIFIERS, CONDENSERS, SCRUBBERS, GASHOLDERS, ROOFS,

And every description of Gas Machinery.

TENDERS GIVEN FOR WORK FIXED COMPLETE IN ANY PART OF THE KINGDOM.

London Office—34, LONDON WALL, MOORGATE STREET, E.C.

JOHN HALL & CO.,

STOURBRIDGE,

MANUFACTURERS of FIRE-BRICKS, LUMPS, & TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

PARIS, 1867.

CLASSES 24 and 53.

WILLIAM SUGG,

GAS ENGINEER.

LONDON, 1862.

CLASSES 13 and 31.

PUBLIC LAMP GOVERNORS, LEVER COCKS, AND POLE LIGHTERS,

LAMP METERS AND BOXES.

IMPROVED LOWE'S JET PHOTOMETERS.

VINCENT WORKS, VINCENT STREET, WESTMINSTER, S.W.

FLETCHER AND MURPHY,

GARRATT STREET WORKS, OLDHAM ROAD, MANCHESTER;

Manufacturers of

IMPROVED CONSUMERS WET GAS-METERS

IN CAST-IRON CASES,

THE UNVARYING WATER-LINE GAS-METER,

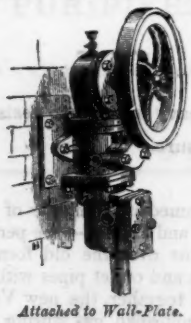
AND

IMPROVED DRY GAS-METERS;

STATION-METERS OF ALL SIZES, with PLANED JOINTS;

GOVERNORS, PRESSURE AND EXHAUST REGISTERS, TEST HOLDERS,

And all kinds of Experimental Gas Apparatus.



Attached to Wall-Plate.

KITTOE & BROTHERHOOD'S

PATENT

"PARAGON" STEAM-PUMP.

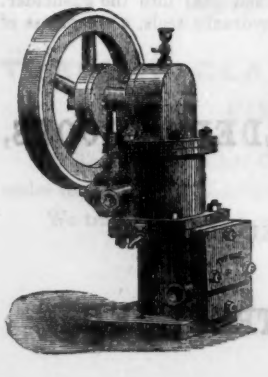
Sizes Nos. 1 to 10 deliver from 75 to 21,000 gallons per hour; the height in feet being equal to twice the steam pressure in lbs. per square inch. Prices from £10 to £90

GAS COMPANY'S OFFICE, LUTON, BEDFORDSHIRE,
Feb. 23, 1870.

Gentlemen,—The Paragon Pump which I purchased of you in 1868 has been in constant use from the date of its purchase to this time, for the supplementary supply of two 8 h.p. steam-boilers. It is in request day and night, and has performed the duties required of it without needing any repairs.

Yours respectfully,

Messrs. Kittoe and Brotherhood. W. PHILLIPS.



MANAGER'S OFFICE, REDHILL GAS-WORKS,
Sept. 3, 1871.

Gentlemen,—The No. 6 Paragon Pump supplied by you has satisfactorily performed the work for which it was ordered—viz., feeding the boiler and pumping up water for the use of the works. In my opinion, it is a very compact arrangement, the working parts are thoroughly enclosed and protected, and the valves are very simply and quickly got at. It is a useful and reliable auxiliary.

Yours truly,

Messrs. Kittoe and Brotherhood. H. T. EVERIST, *Manager.*

FOR FULL PARTICULARS, APPLY TO

MESSRS. BROTHERHOOD & HARDINGHAM,

(LATE KITTOE & BROTHERHOOD AND FORMERLY WILLIAM FOX,)

ESTABLISHED 1825.

Manufacturers of Gas-Exhausters, Pumping and other Machinery.

56 & 53, COMPTON ST., GOSWELL RD., LONDON, E.C.

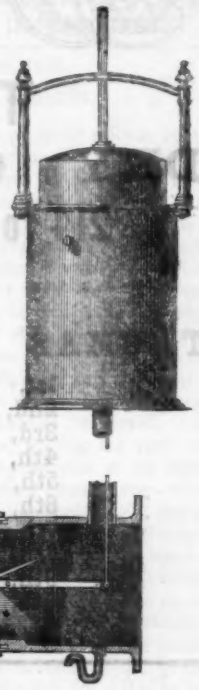
TANGYE BROTHERS & HOLMAN,

10, LAURENCE POUNTNEY LANE, LONDON,

AND CORNWALL WORKS (TANGYE BROTHERS), BIRMINGHAM.

SOLE MAKERS OF

HUNT'S PATENT EQUILIBRIUM GAS-GOVERNOR.



In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communication being avoided by placing the Lever or Radius Arm (shown at C on the drawing) inside the Valve-Chamber, upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

The principal advantages of this arrangement over the ordinary form of Governor are as follows:—

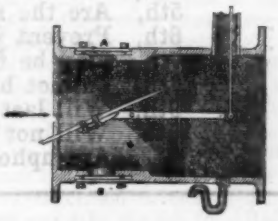
Its sensitive action prevents oscillation.

It is self-adjusting—*i.e.*, it maintains a steady pressure under variations of inlet pressure or a fluctuating consumption.

The Inlet to Gasholder being contracted to the smallest possible dimensions, all danger from leakage through insufficiency of seal, tilting, &c., is entirely avoided.

The Valve portion being separate from the Holder, it can be handled and fixed like an ordinary Slide-Valve direct in the main; and the Holder can be placed at any convenient distance immediately above it. The cost is thus materially reduced, and the inconvenience of heavy lifts done away with.

There are no working parts likely to get out of order.



Two of the Governors may be seen in action at the London Gas-Works, Nine Elms.

"*Dec.* 25, 1871.

"Gentlemen,—The 18-inch Hunt's Patent Throttle-Valve Governor supplied by you to this Company has been in use for about six months, working very satisfactorily. It obviates entirely the oscillation which sometimes occurs with the ordinary Governors, with the annoyance and danger arising therefrom. The efficiency of this instrument, together with its compactness and lowness of price, ought to ensure its general adoption.

(Signed) "ROBERT MORTON, *Engineer,*
"*London Gas-Works, Nine Elms.*"

"Messrs. Tangye Brothers and Holman."

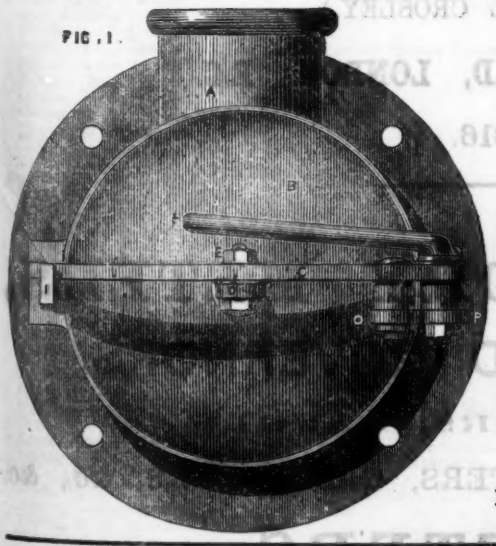
MORTON'S PATENT SELF-SEALING RETORT-LIDS,

WITH

HOLMAN'S

PATENT ECCENTRIC FASTENINGS.

FIG. 1.



"*The Gaslight and Coke Company. Engineer's Office,*
"6, *Westminster Chambers, Nov.* 14, 1871.

"Dear Sir,—In reply to your inquiry, I have the pleasure of stating that the whole of the Mouthpieces at Beckton have Morton's Lids attached to them, and they have given us every satisfaction. We have 2160 in use.—I remain, yours truly,

(Signed) "F. J. EVANS."

THESE

SELF-SEALING RETORT-LIDS

Are adopted by the other Metropolitan Gas Companies, and in the large Provincial Gas-Works at

Liverpool, Dublin, Nottingham, St. Albans, Burslem, Bournemouth, Windsor, Boston, Over Darwen, Manchester, Cheltenham, &c.

CLELAND'S PATENT DIRECT STEAM-JET EXHAUSTERS.

THORNILOE'S PATENT SLUICE-VALVES.

TRAVELLERS AND HYDRAULIC LIFTS FOR PURIFIER-LIDS, &c.

London 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865.

The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

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THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS,

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3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
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10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

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(SUCCESSORS TO SAMUEL CROSLEY,)

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EXPERIMENTAL METERS, PHOTOMETERS, GASHOLDERS, &c., &c.

WATER METERS.

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THE JOURNAL OF GAS LIGHTING, WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, FEBRUARY 27, 1872.

Notes upon Passing Events.

THE movement toward the amalgamations of great railway companies has at length led to a substantial action in the House of Lords. Lord Halifax, a Yorkshireman and an old official, has proposed the appointment of a joint committee of the Lords and Commons to consider the whole question of amalgamation. We hope the difficulty of the Commoners sitting without their hats in the presence of the Lords will not prevent this very desirable consummation. If the Marquis of Salisbury is on the committee, we shall be very sure to hear all that can be said on the railway side of the question. There is one part of the history of the British railway system which the doctrinaires who advocate the transfer of railways to Government altogether ignore or forget; that is, that in all other countries railways are planned and executed not in the interest of the localities traversed, but primarily with the view of paying well and serving the views of Government officials. In this country no principles at all have regulated the authorities—viz., parliamentary committees—who sanctioned the construction of railways. In the beginning it was a series of great fights between rival capitalists or engineers for the privilege of making trunk lines, about the traffic of which there was no mistake. Then came competitive lines either on a great scale or to cut off certain obvious bends and serve a locality. For a competing line on a great scale we may take the Great Northern, which began life as a direct line to York. As a local line made in spite of a grand trunk line yet certain to compel the great line to buy it if sanctioned, we may take the line from Rugby to Stafford, better known as the Trent Valley. The London and North-Western opposed it with all its strength, and as soon as it was constructed bought it. Who would be without it now? In the face of the opposition of Birmingham interests to this string of the railway bow, no Government ever dare ask funds for the construction of such a line as that which Sir Robert Peel's local Tamworth interests led him to patronize, being then in opposition. All the great railway authorities were at that time opposed to the principle of short cuts. The sanction to the Great Northern was a foundation for the extension of the Manchester and Sheffield line to Hull through Lincolnshire. A Government Board would have said, "Hull is well served by the "Midland and Great Northern; why help to build up rival docks at "Grimsby that can never pay, to help an agricultural line through "Lincolnshire that cannot earn a dividend in twenty years?" But as private enterprise prevailed, and a great Lincolnshire nobleman was determined not to leave his tenants out in the cold beyond railway limits; docks were built which have provided a valuable harbour of refuge and created a valuable trade, beside compelling Hull to remodel its dock system. Local interest and engineers speculation prevailed against what were then considered sound railway principles. The results are facilities for the transit of merchandise, agricultural produce, and fish which no consideration of finance would permit any Government to discontinue. No doubt shareholders have suffered from the want of dividends, but then they are no more injured than those who invested in imaginary mines, in the bonds of repudiating states, or shares in bubble banks and financial associations; the public and the localities traversed have gained incalculable profits. In all the country there is not one railroad which is not useful, and only one—a short branch from Cambridge to Newmarket Heath—has ever been constructed and abandoned. Perhaps the very best evidence of the soundness of our system of *laissez-faire* in railway construction is to be found in a line often quoted as the creation of lawyers, engineers, contractors, with the least possible subscribed capital—the London, Chatham, and Dover. This line originated with a few Kentish landowners who required a nearer railway line to London than by Maidstone. They went honestly enough to work, and made great sacrifices; but, as the scheme grew bigger and bigger, it was, to use a modern euphuism,

"financed," and made upon a new form of kite-flying. So much the worse for the people who put their money at fancy interest in so doubtful a speculation—not so doubtful, though, as Tichborne Bonds or Emma Mines. But the great British public obtained without a farthing of taxation, not only a double line to Dover and a new route into Kent and the Crystal Palace, but, most important of all, a new railway bridge across the Thames, and the first junction of the northern system with the southern system of railways by way of the Underground Metropolitan to Kensington, and the Great Northern and its tributaries at King's Cross. Let us take another instance—the Metropolitan, not quite complete inner circle, one of the greatest railway works of the age. For years it simmered in the shape of plans in the projectors prospectus and the engineer's office. At length, by a most fortunate job, the Corporation of London (at the instigation of a very clever and little scrupulous lawyer) were induced to invest £200,000 in the scheme, and it floated, or rather began to mole its way through London. The commercial convenience of line cannot be exaggerated, yet at present it only pays 2½ per cent. Is it possible to imagine a Chancellor of the Exchequer asking for funds for such a work? In fact, as we have arrived at the era of small junctions, little short cuts, little competing lines, and improvement of stations, if the day has come for Government to expropriate railways, we must be resigned to the cessation of all extensions or improvements. The strict economists will ask for an estimate of profits. The ordinary type of M.P. will oppose every shilling not laid out in his own locality, and, warned by the fate of the old man with his ass, the wise minister will do nothing but leave the whole system in *statu quo*. We have never heard a suggestion of how losses of merchandise by a Government line, or accidents to passenger trains, were to be settled. In the Post-Office the Government never pays, and the case of a mistake in a telegram causing pecuniary loss is yet to be tried. How little zeal there is in Government dockyards and offices, we know, and do not blame. There is nothing in the routine of Government work to inspire zeal. How jealous Liberals are to deal with the vast funds the income of railways would place at the disposal of a Government, has not been stated. The great improvements that have taken place in the working of railways in this country, especially in the collection, transit, and delivery of merchandise are due to the exertion of individual energy under responsible managers. A Government system is uniform, slow, and rarely yields to circumstances—in fact, it would be exchanging the system that has made the shipbuilders of the Clyde, the Mersey, the Tyne, and the Thames, world famous, for the costly failures of the Admiralty dockyards. But although we see these and many more objections to the dead-level routine of Government administration and legislation in railway extension and management, we are by no means prepared to leave the public at the mercy of amalgamators. The power of revising tariffs, and even stipulating for traffic arrangements with arbitration clauses, has been exercised before now in favour of the public. The proposed joint committee will probably agree on some definite principles for controlling the possible aberrations of an uncontrolled railway monopoly. The conference of Chambers of Commerce has called for the printing of railway fares on all tickets—a small but important demand. Restraints on the departure of trains from the same or an adjoining station in order to evade an arriving train, may be restrained by arbitration and by an extension of running powers. These, and a host of improvements, are quite possible without a wholesale resort to officialism.

The Metropolitan Board is not cutting a good figure in the matter of Epping Forest. The grievance in the forest is that a system of annexation has been established under which the open spaces are being nibbled away by persons with little or no rights, but whom it is nobody's business to restrain. Under these circumstances the Corporation propose two things—to test, in a court of equity, the titles of recent encroachers, and to raise the amount required for purchasing manorial and other rights by commuting the present metage duties for a duty of one farthing per cwt. on grain. Considering there are taxes on coals and taxes on wine, it is difficult to see how funds for so useful a purpose could be raised in a more harmless manner. To call a duty of a farthing per cwt., which is a reduction of the present metage dues, a tax on bread, is mere claptrap. The opposition of the Board of Works seems to be of the dog-in-the-manger type. When the Corporation takes up so good a works, no prejudice should stand in the way of applause justly due. Lords of the manor and freeholders in Epping Forest have their rights; but we want them defined, and powers to purchase glades and downs and copses not yet invaded by the builder. It is rather difficult to understand the market question, which is being so fiercely debated in the Common Council. One party wishes to enlarge the market on the site of Old Smithfield. The other declares itself content with the improvements contemplated in the poultry and fish markets of Leadenhall and Billingsgate. On which side are the monopolists, who represent the consumers? It is difficult to find this out from the discussions; all proclaim themselves the friends of the people. One curiosity of the debate was the revival of the words "forestalling and re-"grating." We thought these crimes had expired with Judge Kenyon.

This is the age of information. Fifty years ago members of Parliament who asked for information were few in number, and were generally severely snubbed by the ministerial side of the House. Now everybody asks questions, and if possible they are answered.

A great deal of capital has been made by Mr. Stuart Mill, Professor Fawcett, and Mr. Odger, out of a blunder of the census which gives only 30,000 landed proprietors to England; and Lord Halifax has added the collection of a Domesday Book to the other duties of his supposed sinecure office. We can safely prophecy that the return, to make it useful, will require a great many notes and comments. It will be of value as material for essays on both sides of the question; but nothing can alter the fact that, while there is in certain districts a tendency on the part of the superior class of workman and the lower middle class to acquire house property, there is a tendency in rural districts (not mountainous or even very hilly) toward large farms, and on the part of the wealthy, from whatever source their wealth is derived, to invest in and increase territorial estates. It is not that ancient families so much enlarge their estates as that the retired merchants, manufacturers, engineers, and scientific professional men delight in the social importance which broad acres give and nothing else. Politicians of very advanced political opinions share this feeling with Scotchmen and Welshmen, who, as a matter of course, are all nobly descended—at least they say so, when fortune has favoured their industry. What the country most urgently desires is a system of settling titles and conveying land that attorneys cannot spoil with bills of costs. In what way this is to be done the reforming lawyers of the House are not as yet agreed; but as all the heads of the profession, all the leading judges and ex-chancellors, all the law officers of the present Government and of the ex-Government, are agreed that we cannot stay in the present real property quagmire, and that Lord Westbury's Act as it stands is a failure, something must soon be done. Something large will inevitably be attempted the next time a Conservative Government comes into power, with Lord Derby and Lord Cairns in office, unless the Liberals take time by the forelock or take the wind out of their sails.

One land law reform is so obvious a matter of justice that it is wonderful that it has not been more strongly pressed—viz., the registration of all charges and all settlements on land. Once upon a time there were such things as secret consents to judgments and bills of sale, under which an unsuspected creditor suddenly appeared like a torpedo, and blew into infinite space all the claims of honest creditors. That iniquity has been abolished. People can no longer fill their shops with goods or their houses with furniture that belongs to some concealed creditor. Any one by subscribing to a trade protection society can receive periodically a printed list of all the judgments entered up, and all the bills of sale available because registered. But a man may be the nominal owner of a house or a great estate mortgaged up to the eyes, or in strict settlement, and no one know anything about it who has not access to deeds locked up in a chest, and perhaps a century old. This secrecy, this power of maintaining a hollow ghost-like appearance of landed respectability has long been cherished by the landed aristocracy, encouraged by the most respectable class of country attorneys, who hold the post of family confessor held by the priest in mediæval times. But the landed gentry are beginning to find out how much they pay for this imperfect secrecy; and if they had the inclination, legislative power has passed out of their hands. The present generation, in spite of the opposition of the attorneys, have got—we will not say cheap, but cheapened law. They will have simple cheap land conveyance too. For this, two things are essential—a Cadastral survey as complete as tithe or railway survey maps, and a registration of all charges on, as well as all conveyances of land. Disputed boundaries are no insuperable difficulty. They may be marked, and the disputants compelled to go to an arbitrator or jury. At present the law of land conveyance is a great mystery for the benefit of attorneys, conveyancers, and Chancery barristers. This is the point to which the attention of practical reformers should be first and most earnestly directed. But until the whole nature of Englishmen and Scotchmen is changed, until they cease to care for that wealth which gives importance, the holders of small freeholds and of many sons, will not cease to prefer cash and trade to the laborious existence of a small farmer on the only land he can farm with profit in a flat open country—stiff clay. But with a more honest, cheaper system of conveyance, undulating and parched countries would retain a fair share of small dairy and poultry farms.

Mr. Walpole, an excellent man, of whom the Norwegians would say that his fault was that he had not "bone enough in his nose" for office, has brought in a Bill for establishing a public prosecutor. It is not surprising to find on the Conservative side Mr. Douglas Straight, the Criminal Court barrister; and on the Liberal side Mr. Leeman, a highly respectable solicitor of the old school, very much opposed to any change in the present system. But the necessity of making some one, in a more impartial and competent position than a police officer, serjeant, or superintendent, answerable for the duty of investigating and prosecuting crimes, is too obvious to be resisted any longer. Recent events have pressed the grievance home. At present it is quite an accident whether the criminal investigations and prosecutions of a district are or are not properly carried out.

Mr. Beresford-Hope continues to perform his duty as the champion of the *statu quo* in metropolitan locomotion. Last year he defeated the tramways, this year his hostility extends to underground lines, and he fought a tough fight on the second reading of the Mid-London Railway, the course of which we explained the other day. He had the support of Colonel Hogg, who, as representative of the Metropolitan Board, is naturally against a scheme which would render their great roundabout street improvement unnecessary. Why certain Liberal aldermen M.P.'s voted against the Mid-London we cannot understand, unless it was in the character of governors of that grossly-abused charity, Christ's Hospital, the last big boarding-school within the limits of the City, for Charterhouse is doomed to "fresh fields and pastures new." We thought all the City was unanimous in hailing this Mid-London scheme as the solution of a great difficulty and a checkmate to the latest efforts of the Metropolitan Board of Works, but it seems that in this instance "the house is divided against itself."

A capital suggestion has been made by that indefatigable school reformer, the Rector of Bishopsgate, for improving out of existence a badge of charity. When ward schools were established, parents were bribed to send their children to learn the three R's by clothing gratis. The ward schools are being remodelled and consolidated under the pressure of the School Board Act, which, by-the-bye, is stirring up a good many educational institutions. It is proposed the clothing shall no longer be bestowed indiscriminately amongst the pupils, but that it shall be reserved as a reward of merit. Then the finger of scorn will no longer be pointed at "Charity Boys," but the wearers of anything in the shape of a school dress will be marked as the head boys, the prize-holders of the ward or parish.

We were much puzzled by an account of the ceremonies of the "Poulters Company," but on investigation discovered that this must be the Poulterers Company, as the master is in that trade in Leadenhall Market. It seems to be a fair example of the chartered companies of the City of London. It has no hall and no duties. It took no official part in the contest about the poultry market. But the other day about thirty "Poulters" met in form. Some of them with their beadle attended a sermon at St. Peter's, Cornhill, and then, after distributing £10 to the poor of the parish (who cannot possibly benefit by such doles), dined together at the Albion at an expense of from one to two guineas a head. The Poulters are not worse than any other of the companies that have sold or let their halls to dine on the proceeds, or, indeed, than those who have sunk vast sums in dining halls. But when there are no public institutions for teaching physical science in the city, when free libraries, reformatory industrial schools, and convalescent hospitals, are so much needed, these samples of sham charity and scientific feeding are really too bad. In the same spirit, we hear of the new St. Thomas's Hospital without a convalescent ward, and with one great pavilion devoted to an annual pageant.

Circular to Gas Companies.

The Ryde gas arbitration has resulted in an award of £58,443, to be paid by the Corporation for the gas undertaking of the company, or exactly 22½ years purchase of the maximum statutory dividend of the company. The arbitrators were unable to agree, and the award was made by the umpire, who seems to have thrown overboard the six days evidence and speechifying, and adopted as the basis of his award a certain number of years purchase of the statutory profits, greater than was contended for by the representatives of either the company or the Corporation, and to have set off the claims of the former for surplus plant and land against the claim of the latter for dilapidations. It will be remembered that the whole sum demanded by the company was £65,933, which was made up of £56,959, being 20 years purchase of the statutory dividends, £3444 the estimated value of surplus plant, and £5530 for surplus land available for future extensions of works. On the other side, it was contended by the Corporation that the estimate of income made by the company could not be depended upon, inasmuch as the present price of gas could not long be maintained; that a large allowance must be made for depreciation of plant, and that as any surplus plant had been paid for out of the capital on which dividend was paid, its value would be included in a purchase based on capitalized profits. The Corporation estimated the future net income of the company at £1810, and capitalized this at 16¾ years purchase, which brought out £30,168 as the value of the concern. A small deduction being made for depreciation which the works had undergone —the estimated value of the concern by the Corporation was £27,600. Thus the sum awarded is £20,843 in excess of the amount which the Corporation contended was the full value.

The award, we believe, carries with it the stock and all the floating assets of the company; but the Corporation have to pay the costs of the arbitration and award, which are estimated at £3500, so that altogether the cost of the undertaking to the Corporation will be in round figures £62,000, or £5 10s. per head on the present population of Ryde. According to the local papers the news of the amount awarded was received with consternation by all classes of inhabitants, and an attempt is threatened to oppose the confirmation of the purchase. This step, however, is proposed too late, for the money to complete the purchase is already borrowed at 4½ per cent., and the Ryde ratepayers have been paying £7 8s. *per diem* interest since the 1st of January last. The purchase is unquestionably an onerous one for Ryde, as the statutory profits, little more than balance the interest of the purchase-money. In the end the Corporation will probably come to the conclusion that they had better have left the concern in the hands of the company.

One immediate effect of the publication of the terms of this award is the withdrawal of the Bill promoted by the Elland Local Board for the compulsory purchase, by arbitration, of the undertaking of the Elland-cum-Greetland Gas Company, the directors of which had agreed to sell on terms which the shareholders at a general meeting rejected. Hence the introduction of the Bill which is now withdrawn, the Corporation apparently being afraid that arbitration will not cheapen the price of the undertaking.

The Municipal Corporation (Borough Funds) Bill has been reintroduced by Mr. Leeman, and was read for the first time on Monday, the 19th inst. It is the former Bill as amended by the select committee of last year, and has all the objectionable features we pointed out in our comments on its progress last session. No time should be lost in organizing resistance to a measure which so seriously threatens the interests of all private enterprise, and, it may be added, all ratepayers. If the Bill should become law, it will open the way to the most shameful squandering of public money—for no purpose but to harass gas and water companies.

The report of the half-yearly general meeting of the Imperial Gaslight Company, which we print in another column, is particularly worthy of attention as showing the effect of a small reduction of price on the finances of this important company. Last year the company made a reduction of 1d. per 1000 feet in the price of gas, and the consequence has been that they have had to take £5590 from the reserve-fund to make up the statutory dividends for the past half year. When the reduction was made the present rise in the price of coals and advance in wages was hardly to be foreseen, and a pressing necessity for a concession to public demands was felt by the directors. The result will probably be a continued draw upon the reserved fund until the profit on increased consumption makes up for the deficiency, which, considering the district enjoyed by the Imperial Company, and the enormous amount of building going on therein, cannot be long deferred.

The death is announced of Mr. John Grafton, the last survivor of the pioneers of gas lighting, which took place at his residence in the Harrow Road, Paddington, on the 19th inst. In early life, Mr. Grafton was one of Mr. Samuel Clegg's assistants; and as such, or on his own account, established several of the early gas-works. He seems to have joined Mr. Clegg about the year 1814, and his first invention was a hand-lamp to replace the torch which the public lamplighters carried in those days. We next find him, in 1818, taking out a patent, to which we have recently referred, in connexion with the sensational invention of the day—namely, for converting tar into gas, by "delivering it in a regulated manner "into a second retort heated to redness, and previously filled with "iron filings, coke, or other substances known, which convert "the tar and oil into gas." In this patent, too, we find the germ of a clay retort in the improvement of an iron retort, lined or cased with fire-clay. In the following year, Mr. Grafton patented a process for purifying gas with caustic alkali and lime, and in the next year retorts made of Stourbridge clay. The first retorts were made square-shaped, and composed of several pieces, which were joined together by wet fire-clay, or other proper cementing substance; but they were subsequently made of the oven or D shape, still common. Again, in 1838, he patented the use of

some machinery for charging and discharging retorts, and also a pipe at each end of a retort to facilitate the exit of the gas; for at this time experiments made at his works at Cambridge had convinced him that the "furring-up" of retorts was owing to the detention of gas in the retorts under pressure. In the same year he made the first application of an exhauster, which he endeavoured to make at the same time a purifier. It was, in fact, nothing more than a wet meter set in action by machinery in the reverse direction to that in which one rotates when registering, and charged with lime and water. The objection to this instrument, which well fulfilled its object, was the power required to drive it. Mr. Grafton was also unquestionably the first to construct and use fire-brick ovens for the distillation of coal—a system which was soon improved upon by Spinney, Clift, Emmott, and others. His patent for fire-brick retorts is dated 1841, and in this, too, we find an anticipation of a recent invention, for there is mention of a decomposing-retort filled with burning coke, and heated by a furnace fire, and so arranged that the gas liberated from one end of any retort during the first three hours after the retort has been charged might be caused to pass through this "decomposer," and during the remainder of the time occupied with a charge the gas might pass on to the exhauster direct.

Some years since, in conjunction with the late G. E. Goldsmid, Mr. Grafton established large meter-making works in Paris, which are successfully carried on up to the present time, and in which we believe he retained an interest. He was proprietor for many years of the Cambridge works, and more recently a director of the Leamington and the Brighton and Hove Gas Companies. His name will always be mentioned with honour when the early history of gas lighting is told.

In pursuance of the announcement made in our last issue, we publish to-day the specification of Dr. Eveleigh's last patent, and present our readers with a reduced copy of the accompanying drawings. In the face of the sensation created within and without the gas world by the present success of the Patent Gas Company, we could do no less than afford our readers the fullest means of judging for themselves of the value and novelty of Dr. Eveleigh's inventions. To fully comprehend the nature of the invention, this specification should be read with the former, dated Jan. 7, 1869 (No. 45), an abstract of which will be found at page 63, vol. xix., of the JOURNAL OF GAS LIGHTING, &c.

Parliamentary Intelligence.

HOUSE OF LORDS.

FRIDAY, FEB. 9, 1872.

The LORD CHANCELLOR acquainted the House that the Standing Orders applicable to the WAKEFIELD WATER Bill had not been complied with.

MONDAY, FEB. 12.

The following Bills were presented, and read a first time:—DARLINGTON BOROUGH SEWAGE IRRIGATION; DUNDEE GAS; DUNDEE WATER; NOTTINGHAM AND LEEN DISTRICT SEWERAGE; POTTER'S BAR GAS; TAMWORTH GAS; TONBRIDGE GAS; WILMSLOW AND ALDERLEY EDGE GAS; and CHELTENHAM GAS.

TUESDAY, FEB. 13.

The following Bills were presented, and read a first time:—DARLINGTON IMPROVEMENT; ELLAND LOCAL BOARD OF HEALTH; and WAKEFIELD WATER.

THURSDAY, FEB. 15.

The BIRSTAL LOCAL BOARD Bill was presented, and read a first time.

FRIDAY, FEB. 16.

ELLAND LOCAL BOARD OF HEALTH Bill.—The Chairman of Committees informed the House that the promoters do not intend to proceed further with the Bill during the present session.

The DUNDEE GAS; DUNDEE WATER; TONBRIDGE GAS; and WILMSLOW AND ALDERLEY EDGE GAS Bills, were read a second time.

MONDAY, FEB. 19.

The DARLINGTON BOROUGH SEWAGE IRRIGATION; NOTTINGHAM AND LEEN DISTRICT SEWERAGE; POTTER'S BAR GAS; and TAMWORTH GAS (CONSTRUCTION OF RAILWAY, &c.) Bills, were read a second time.

TUESDAY, FEB. 20.

The BIRSTALL LOCAL BOARD Bill was read a second time.

THURSDAY, FEB. 22.

A petition was deposited against the TAMWORTH GAS (CONSTRUCTION OF RAILWAY, &c.) Bill, from Sir Robert Peel.

FRIDAY, FEB. 23.

The DUNDEE GAS; TUNBRIDGE GAS; DUNDEE WATER; and WILMSLOW AND ALDERLEY EDGE GAS Bills, were committed.

Petitions were deposited against the DUNDEE WATER Bill, from the inhabitants, &c., of Dundee;—and against the WILMSLOW AND ALDERLEY EDGE GAS Bill, from London and North-Western Railway.

HOUSE OF COMMONS.

MONDAY, FEB. 12

The following Bills were read a first time:—GASLIGHT AND COKE COMPANY; SOUTH LONDON GAS; GLASGOW CORPORATION WATER; BRIGHTON CORPORATION WATER; MANCHESTER CORPORATION WATER; SOUTHWARK AND VAUXHALL WATER; ALTRINCHAM GAS; BURY IMPROVEMENT AND WATER; HINDLEY LOCAL BOARD (No. 2); TROWBRIDGE AND WESTBURY WATER; GLOUCESTER GAS; NEWPORT AND PILLGWENLLY WATER; KEIGHLEY WATER; WARWICK LOCAL BOARD WATER; ROCHDALE BOROUGH EXTENSION AND IMPROVEMENT; HAWORTH LOCAL BOARD OF HEALTH; BOLTON CORPORATION; BRISTOL WATER; CARNARVON CONSUMERS GAS; DONCASTER WATER; AND ILFRACOMBE GAS.

TUESDAY, FEB. 13.

The following Bills were read a first time:—KINGSTON-UPON-HULL WATER, &c.; LYMM LOCAL BOARD GAS; and NORTH CHESHIRE GAS.

WEDNESDAY, FEB. 14.

The following Bills were read a first time:—ABERYSTWITH IMPROVEMENT, WATER, &c.; BRIDPORT WATER; and SHEFFIELD CORPORATION (PAYMENT OF COSTS).

THURSDAY, FEB. 15.

The WALLASEY IMPROVEMENT Bill was read a first time.

Petitions were deposited against the DONCASTER WATER Bill, from Charles Wilson;—and against the SOUTH LONDON GAS Bill, from the Vestry of St. Giles', Camberwell.

FRIDAY, FEB. 16.

THE WATER SUPPLY OF THE METROPOLIS.

Mr. STAPLETON asked the Secretary of State for the Home Department whether it was intended to take any steps under the Metropolis Water Acts, 1852 to 1872, in consequence of the polluted state of the water recently supplied by some of the water companies.

Mr. CHICHESTER FORTESCUE: As, under the Acts relating to the water supply of the metropolis, the Board of Trade has the power to appoint an examiner, perhaps it is right that I should answer the question. What has been done under the Act has been this: A water examiner has been appointed, who has been instructed to visit and to examine, at least once a month, the reservoirs and filter-beds of all the water companies, and to report as to the state of the filtration before the water passes into distribution. He is also instructed to make a special report whenever there is any necessity for it. In the case to which the honourable gentleman's question refers, he was instructed to make a special report, and that report I have only just received, in fact only this day, and I have not had time to examine it carefully. After examining and considering that report, I shall be able to decide whether there ought to be any further inquiry into the state of the water supplied by these two companies. But I may add that the examiner reports that the water at this moment is much better than it has been. The impurity, such as it was, during January, appears to have been caused partly by the heavy floods in that month, and partly by the fact that the companies concerned were carrying on very important works, improvements, and alterations, which rendered it difficult for them to carry out at the time the slow process of filtration which is so important. If the honourable member wishes to have a copy of the report of the examiner, and he will move for it, I shall be very happy to lay it on the table.

Reported—That Standing Order No. 71 had been complied with in respect of the NEWPORT AND PILLGWENLLY WATER, GLOUCESTER GAS, and BRISTOL WATER Bills.

The PUBLIC HEALTH Bill, and the PUBLIC HEALTH AND LOCAL GOVERNMENT Bill, were presented, and read a first time.

Petitions were deposited against the NORTH CHESHIRE GAS Bill, from the Altrincham Gas Company;—and against the SHEFFIELD CORPORATION (PAYMENT OF COSTS) Bill, from the Sheffield Water-Works Company, and Samuel Roberts and others.

SATURDAY, FEB. 17.

A petition was deposited against the ROCHDALE BOROUGH EXTENSION AND IMPROVEMENT Bill, from the Trustees of the Rochdale, Halifax, and Elland Turnpike Trust.

MONDAY, FEB. 19.

The following Bills were read a second time and committed:—ABERTSTWITH IMPROVEMENT, WATER, &c.; ALTRINCHAM GAS; BARROW-IN-FURNESS CORPORATION; BOLTON CORPORATION; BRIDPORT WATER; BRIGHTON CORPORATION WATER; BURY IMPROVEMENT AND WATER; CARNARVON CONSUMERS GAS; DONCASTER WATER; GLASGOW CORPORATION WATER; HAWORTH LOCAL BOARD OF HEALTH; HINDLEY LOCAL BOARD; ILFRACOMBE GAS; KINGSTON-UPON-HULL WATER, &c.; LYMM LOCAL BOARD GAS; NORTH CHESHIRE GAS; RHYL IMPROVEMENT; ROCHDALE BOROUGH EXTENSION AND IMPROVEMENT; SHEFFIELD CORPORATION (PAYMENT OF COSTS); and WARWICK LOCAL BOARD WATER.

The MUNICIPAL CORPORATIONS (BOROUGH FUNDS) Bill was presented, and read a first time.

Petitions were deposited against the BOLTON CORPORATION Bill, from the Trustees of the Bolton and Westhoughton Turnpike Road, Bolton Gas Company, Managers of the Waysh Water, and Wm. Jackson Rideout;—against the BRIGHTON CORPORATION WATER Bill—from the Brighton, Hove, and Preston Constant Service Water-Works Company;—against the CARNARVON CONSUMERS' GAS Bill—from William Crippin;—against the NORTH CHESHIRE GAS Bill, from the Stretford Gas Company;—against the ROCHDALE BOROUGH EXTENSION AND IMPROVEMENT Bill, from the Trustees of the Rochdale and Manchester Turnpike Trust;—and the Rochdale and Edenfield Turnpike Road Trustees;—and against the SOUTH LONDON GAS Bill, from the Crystal Palace District Gas Company.

TUESDAY, FEB. 20.

The KEIGHLEY WATER; MANCHESTER CORPORATION WATER, &c.; and WALLASEY IMPROVEMENT Bills, were read a second time, and committed.

The BIRMINGHAM SEWERAGE Bill was read a first time.

Petitions were deposited against the HAWORTH LOCAL BOARD OF HEALTH Bill, from the Oakworth Local Board of Health and the Keighley Local Board of Health;—against the ROCHDALE BOROUGH EXTENSION AND IMPROVEMENT Bill, from the Rochdale Canal Company; and Oliver Holt and others;—and against the TROWBRIDGE AND WESTBURY WATER Bill, from the Rev. John Baron and others.

WEDNESDAY, FEB. 21.

The BRISTOL WATER; GLOUCESTER GAS; and NEWPORT AND PILLGWENLLY WATER Bills, were read a second time, and committed.

Petitions were deposited against the BOLTON CORPORATION Bill, from R. H. Ainsworth, R. Howarth, and S. A. Rostron;—against the BURY IMPROVEMENT AND WATER Bill, from Lancashire and Yorkshire Railway Company; Heywood Local Board; Edenfield Chapel and Little Bolton Turnpike Road; and owners of property and ratepayers of Tottington, Lower End;—against the GLASGOW CORPORATION WATER Bill, from the Corporation of Renfrew;—against the KEIGHLEY WATER Bill, from the Haworth Local Board of Health; and Michael Merrall;—against the RHYL IMPROVEMENT Bill, from the Rhyl Bridge Company;—and against the ROCHDALE BOROUGH EXTENSION AND IMPROVEMENT Bill, from the Heywood Local Board; and Robert Whitaker and others.

THURSDAY, FEB. 22.

Petitions were deposited against the ALTRINCHAM GAS Bill, from the Earl of Stamford and Warrington;—against the BIRMINGHAM SEWERAGE Bill, from the

Birmingham Water-Works Company;—against the BOLTON CORPORATION Bill, from the Lancashire and Yorkshire Railway Company; Sir Charles H. Tempest, Bart.; James and John Hodgkinson; H. M. Richardson; millowners, &c.; ratepayers of Great Lever, &c.; Astley Bridge Local Board; Halliwell Local Board; and Earl of Bradford;—against the BURY IMPROVEMENT AND WATER Bill, from Bury and Bolton Turnpike Road Trustees; J. Whitehead, jun., and Jesse Haworth, Justices of Lancashire; J. and J. J. Mellor; and Ramsbottom Local Board;—against the DONCASTER WATER Bill, from the Corporation of Doncaster; trustees of the late Duke of Leeds; and Manchester, Sheffield, and Lincolnshire Railway Company;—against the GASLIGHT AND COKE COMPANY'S Bill, from the Marquis of Westminster; and Metropolitan Board of Works;—against the GLASGOW CORPORATION WATER Bill, from Clyde Navigation Trustees;—against the HINDLEY LOCAL BOARD Bill, from the Lancashire and Yorkshire Railway Company; the Warrington District Highway Board; Wigan Gas Company; Corporation of Liverpool; and from the Local Board for the District of Ince in Makerfield;—against the MANCHESTER CORPORATION WATER, &c., Bill, from the Lancashire and Yorkshire Railway Company; and the Mersey and Irwell Navigation Company;—against the NORTH CHESHIRE GAS Bill, from the Earl of Stamford and Warrington;—against the RHYL IMPROVEMENT Bill, from Conwy G. H. R. Conwy; and owners, &c., of property, and others;—against the ROCHDALE BOROUGH EXTENSION AND IMPROVEMENT Bill, from Buersil District Local Board; J. B. N. Entwistle, and others; Thomas Chadwick, and others; and Lancashire and Yorkshire Railway Company;—against the SOUTH LONDON GAS Bill, from the Vestry of St. Mary, Lambeth, and Vestry of St. Mary, Newington; South-Eastern Railway Company; Metropolitan Board of Works, and Wandsworth District Board of Works;—against the SOUTHWARK AND VAUXHALL WATER Bill, from the Metropolitan Board of Works;—and against the TROWBRIDGE AND WESTBURY WATER Bill, from R. L. H. Phipps.

FRIDAY, FEB. 23.

Petitions were deposited against the ALTRINCHAM GAS Bill, from the promoters of the North Cheshire Gas Bill;—against the BIRMINGHAM SEWERAGE Bill, from the Great Western Railway Company;—against the BOLTON CORPORATION Bill, from the London and North-Western Railway Company and the Corporation of Manchester;—against the BRIDPORT WATER Bill, from R. Groves, B. Legge and Rev. E. E. P. Legge, E. A. Mansell and others, and Rev. J. S. Cox;—against the BRIGHTON CORPORATION WATER, from V. F. B. Stanford and others; Brunswick Square and Terrace Commissioners; West Hove Improvement Commissioners; owners, &c., of property in Preston;—against the BURY IMPROVEMENT AND WATER Bill, from the Earl of Derby; Rev. E. J. G. Hornby; Radcliffe Road Trustees; and inhabitants, &c., of the hamlet of Walmersley;—against the CARNARVON CONSUMERS GAS Bill, from London and North-Western Railway Company and G. W. D. A. Smith;—against the DONCASTER WATER Bill, from T. B. Bosvile; W. Wood and others; W. W. Hoole; L. Fullerton; and Earl Fitzwilliam;—against the GASLIGHT AND COKE COMPANY'S Bill, from the Lord Mayor, Aldermen, and Commons of the City of London;—against the GLASGOW CORPORATION WATER Bill, from magistrates, &c., of Maryhill, Hillhead, Patrick, Crowhill, and Govan; trustees of the late W. Dixon; Cathcart Parochial Board; owners of factories on river Clyde; Corporation of Rutherglen; provost, magistrates, &c., of Pollokshaws;—against the HAWORTH LOCAL BOARD OF HEALTH Bill, from the Keighley and Worth Valley Railway Company;—against the HINDLEY LOCAL BOARD (No. 2) Bill, from the London and North-Western Railway Company;—against the KEIGHLEY WATER Bill, from W. and T. Heaton; and Keighley and Worth Valley Railway Company;—against the KINGSTON-UPON-HULL WATER, &c., Bill, from Sir J. Walker, Bart.; and owners, lessees, and occupiers;—against the LYNN LOCAL BOARD GAS Bill, from the London and North-Western Railway Company;—against the MANCHESTER CORPORATION WATER Bill, from Baron Egerton;—against the NORTH CHESHIRE GAS Bill, from the London and North-Western Railway Company;—against the SOUTH LONDON GAS Bill, from the Woolwich Equitable Gas Company; Woolwich, Plumstead, and Charlton Consumers Gas Company; London, Brighton, and South Coast Railway Company; London, Chatham, and Dover Railway Company; Plumstead Board of Works; and E. Dresser Rogers and others;—and against the TROWBRIDGE AND WESTBURY WATER Bill, from inhabitants of Westbury; and Messrs. Clark and others.

Legal Intelligence.

COURT OF CHANCERY.—TUESDAY, FEB. 13.
(*Before Lord Justice* JAMES.)

CITY OF MOSCOW GAS COMPANY *v.* INTERNATIONAL FINANCIAL ASSOCIATION.

Mr. FRY, Q.C., and Mr. COOKSON, appeared for the appellants; Mr. C. HALL and Mr. DAVEY for the respondents.

This was an appeal from an order of the Master of the Rolls, directing the plaintiffs to give security for the costs of the suit. The defendants are mortgagees of the works of the plaintiffs, and they filed a bill for foreclosure, upon which the bondholders of the City of Moscow Gas Company, which is now in liquidation, obtained leave of the court to file the present bill in the name of the company, by which they seek to impugn the security of the International Company on the ground that the mortgage by the directors of the gas company of the works at Moscow was *ultra vires*, and by which they also seek to cut down the amount of the security, and to redeem at a smaller amount. The gas company having no property in this country, the defendants took out a summons requiring them to give security for the costs of this suit, under the 69th section of the Companies Act, which provides that where a limited company is plaintiff in any suit, &c., any judge having jurisdiction in the matter may, if it appears by any credible testimony that there is reason to believe that if the defendant were successful in his defence the assets of the company will be insufficient to pay his costs, require sufficient security to be given for such costs. In the present case it was alleged that the gas company were insolvent. They now appealed from the order of the Master of the Rolls.

Mr. FRY, for the appellants, contended that this was a cross bill, and merely a defence to the original suit, and that the appellants ought, therefore, not to be required to give security for costs.

Mr. HALL said if this were a *bonâ fide* application made on behalf of the plaintiff company, he should address himself at once to the question before the court. But this was not the application of the company, but of certain individuals in the name of the company. It was filed under the order of Vice-Chancellor Bacon, acting for the Master of the Rolls, upon the application of certain bondholders of the City of Moscow Gas Company, that they might be at liberty to institute a suit on their own behalf, but in the name of the company, for the purpose of obtaining relief as bondholders. That leave was not given to the bondholders without their being required to give security for the cost attending it, and it was not, therefore, fair that the defendants also should not have security for their costs. This was a suit under the guise of a cross bill, for the purpose of impeaching the security of the plaintiffs in the original suit in respect of these particular bondholders, who alleged in substance that they had been deceived by the directors of the gas company in reference to the issue of the bonds, and prayed that the security of the International Financial Association might be declared posterior to theirs.

After lengthened arguments on the practice of the court in reference to requiring security for costs,

Lord Justice JAMES said he was of opinion that this case was governed by that of the *Washoe Mining Company v. Ferguson* (L. Rep. 2 Eq. 371), and that the second suit was not so strictly in the nature of a cross suit to the first as to make the rule applicable, which exempts the plaintiff company in a cross suit from the obligation to give security for costs. The order of the Master of the Rolls was perfectly right, and must be affirmed.

The appeal was therefore dismissed, with costs.

COURT OF EXCHEQUER.—SATURDAY, FEB. 24.
(*Sittings at Nisi Prius, at Guildhall, before the* LORD CHIEF BARON *and a Special Jury.*)

AIRD AND ANOTHER *v.* BROAD—BROAD *v.* AIRD AND ANOTHER.

Sir JOHN KARSLAKE, Q.C., Mr. WATKIN WILLIAMS, and Mr. G. P. BIDDER appeared for Mr. Aird and others; Mr. MANISTY, Q.C., Mr. ASTON, Q.C., and Mr. J. O. GRIFFITS for Mr. Broad.

These were cross actions, arising out of a contract entered into by Messrs. Aird for the construction of the new works at Beckton, North Woolwich, for the Chartered Gaslight Company, for which Mr. Broad took the sub-contract for the supply of the iron-work and erection of four gasholders of an unusual size. The causes promised to involve difficult engineering as well as legal questions, and were ultimately referred, with all matters in difference between the parties, to Mr. Hawkshaw, C.E., and, failing him, to Mr. W. H. Barlow, C.E., with power to call in Mr. Macnamara as legal assessor.

Miscellaneous News.

EUROPEAN GAS COMPANY, LIMITED.

The usual Extraordinary (Half-Yearly) General Meeting of the Shareholders of this Company was held at the Offices, Austin Friars, London, on Wednesday, Feb. 14—W. WHITE, Esq., in the chair.

The SECRETARY (Mr. H. M'L. Backler) read the advertisement convening the meeting, also the following report of the directors:—

Gentlemen,—Your directors have the satisfaction to report that a marked improvement has taken place in the affairs of the company, which up to September had not recovered from the depression occasioned by the war and subsequent political affairs in France.

At *Amiens* and *Rouen* the various factories and industrial establishments have been in full work, except for a short time during a temporary misunderstanding between masters and men.

Excavations for the new gasholder-tank at the former station were effected in the course of the autumn, but all work connected therewith was suspended during winter. It will now be resumed, in order that the gasholder may be completed, according to contract, early in May.

Boulogne had not materially suffered from the war, but stringent regulations respecting passports having deterred many English families from resorting there last season, no improvement on the previous year's returns can yet be recorded.

The transformation of the works, required by the municipal authority as the price of allowing them to remain on the present site, has been uninterruptedly proceeded with, and the outlay will not be altogether unremunerative, inasmuch as advantage has been taken of every alteration to introduce improvements which will be of value in economizing the cost of gas.

Caen station is slowly returning to the position it formally held under more auspicious circumstances.

At *Havre*, trade is exceedingly active; a great extension of commercial transactions appears certain, and as building operations have been resumed in the town on a large scale, no doubt can be entertained of a well-sustained increase in the company's business.

Nantes had the privilege in 1870 of temporary establishments for the manufacture of implements of war, and although these were discontinued more than twelve months ago, the gas-rental has meanwhile been well maintained.

For several months past the rates of exchange with France have been adverse to the company, but a gradual improvement has recently set in, and remittances are now made on comparatively favourable terms.

Unusual difficulties have occurred in supplying the stations with north country coals, owing both to restricted production and increased demand. Prices have been raised in an unprecedented proportion, and although the company was guaranteed to some extent by contracts, the effect will be perceptible even in the accounts of the current year.

In mitigation of this extra charge, your directors have secured a large quantity of the best French gas coals on reasonable conditions.

It is almost superfluous to add that coke participates in the increasing value of fuel, and this important source of revenue may fairly be looked to as affording compensation in some degree for the additional cost of coals.

Measures are being taken to derive greater advantage than hitherto from the sale of tar and ammoniacal liquor, by erecting apparatus at the stations for the chemical treatment of these products, from which profitable results may be confidently anticipated.

Your directors are likewise doing all in their power to stimulate the use of gas, and have found the introduction of day pressure highly successful in towns not previously so supplied.

The increase of consumption since September has exceeded their expectations, and the future prospects are such as to afford good ground for hopes of a further and continuous extension.

Debentures to the amount of £25,700, at 6 per cent. and 5½ per cent., which fell due on the 1st of January, were replaced or renewed at 5 per cent., and your directors are gratified to be able to state that all the original 6 per cent. debentures have now been extinguished.

A warrant for the interim dividend at the rate of 8 per cent. per annum was forwarded to every shareholder as usual on the 31st of January.

The CHAIRMAN: Gentlemen, having heard the report read, you will have learnt that the effects of the war upon the business of the company are very satisfactorily passing away. In fact, our business is rapidly increasing, and if we had not to encounter and overcome many fresh difficulties with regard to the supply of the various stations with coal, we should now be in a position at least equal to that which we occupied previous to the breaking out of hostilities. This must be as gratifying a fact to you as it is to the directors. It was hardly to be expected even by the most sanguine person amongst us, for though we hoped the French nation would gradually recover from the very crushing blow under which it had fallen, and by which it was almost exhausted, we could scarcely have expected that prosperity would so soon return to us in the large towns where the principal part of our business is conducted. I have alluded to the difficulty respecting coal, for it is that part of our transactions which has caused the directors a considerable amount of anxiety lately, but I do not expect we shall permanently suffer from it, or at any rate to the present extent, because the extra expenditure to which we are put will be in some measure recouped by the improved price which we obtain for our coke, so that if we pay more for coals we may hope to get a portion of the additional cost returned in the sale of this product. The revival of trade in our own country has caused an immense demand for coal in the north of England, and, as you are aware, our respected friends, the north country men, are not slow to take advantage of any opportunity which may offer to increase their profits. They have accordingly done so on this occasion, which is quite natural, and therefore your directors at once tried to devise some means by which to reduce to a minimum the burden it threw upon the company. This has been effected by a considerable purchase of French coals, which at present prices can compete successfully with coals of a similar quality and description obtained from this country. Your directors were very glad to avail themselves of this supply, inasmuch as it has enabled them to encourage the products of the nation in which your business is mainly conducted, a course they have ever pursued when circumstances rendered it consistent with your interests. The report states that the increased value of coke and tar will in no small degree recoup a portion of the extra cost of coals. The present price we hope will not permanently be maintained, but it is reasonable to assume that if it continues to increase, the value of coke and other products will increase too, so that we shall be partially reimbursed in that way. You will see that we are using every exertion to add to the revenue of the company in various ways, not only by the sale of coke, but in

the utilization of the other products of gas manufacture, by reserving to the company the chemical treatment of the tar and ammoniacal liquor. We have carried out these transactions to a sufficient extent to prove that we may confidently anticipate deriving profitable results. I am glad to say that all our stations remain in good order, except perhaps Boulogne, which is entirely in a transitional state in consequence of the large alterations going on there. We have no doubt, however, that the improvements which the alterations enable us to make at that station will be highly beneficial, and tend to economy in the cost of manufacturing gas. You may recollect that when we commenced to issue debentures, eleven years ago, we were obliged to pay 6 per cent. for the money as an inducement to investors, the credit of the company not standing so high as at present. We are now, I am happy to say, enabled to renew all our debentures at 5 per cent. All the original issue at 6 per cent. is now withdrawn, which I think speaks well for the position of this undertaking. Within the last two years, as I need hardly remind you, this company have met with very serious troubles, greater troubles, indeed, than any of us could have anticipated; but these have happily passed away, and I hope and believe we are now on the high road to prosperity, and that we shall permanently remain in that position. Of course, none of us can tell what may happen in the coming year; we little expected the hostilities which took place in France; but whatever may be the course of events, whether unchecked prosperity or difficulty should again surround us, you may rely upon it that your directors will be constantly alive to your interests and ready to grasp every opportunity and turn it to your advantage. Should adversity be our portion, we are quite prepared to do as we did before, and grapple with the trials to which we may be exposed, in the hope that by energy and prudence we may be able to overcome them. I shall be happy to answer any question which may be put to me respecting the affairs of the company, and will conclude by moving—"That the report of the directors now read be adopted and entered on the minutes."

Mr. Fawcett seconded the motion.

The Secretary, in answer to a question, said the debentures varied in date from ten years down to three, and the total amount was £93,150.

A Proprietor: I suppose there is a good and ample supply of French coal to be had if you want it?

The Chairman: We have taken a large supply of coal from England, but in order to reduce the comparative price we have taken about a quarter of our consumption from France. We have made a contract for the supply of what we want.

A Proprietor: Is the price much lower than that of English coal, taking into account the quality of the gas which it yields?

The Secretary: There is a considerable difference, taking into account not only the first cost of English coal, but also the freight and expenses.

A Proprietor: From what part of France is it obtained?

The Secretary: From the north of France—the Pas de Calais.

The motion was put, and carried unanimously.

Mr. Stokes: It is very gratifying to find the company in still waters again. A little time ago our prospects were gloomy, but the account we have received to-day of the condition of the several stations is very cheering. I trust the returning prosperity will continue, and that we shall soon enjoy the full amount of our former profits. I am sure we owe much to the ability and energy with which our affairs have been conducted, and, therefore, I have much pleasure in moving a cordial vote of thanks to the chairman and directors for their services.

Mr. J. Crowden seconded the motion, which was put, and carried unanimously.

The Chairman: Gentlemen, we thank you for this renewed mark of your confidence and approval. I may just take the opportunity to make one remark about the use of French coal. We not only think it advisable to use it on account of the price, but we are desirous, in your interest, to let the north of England people see that we can get coals elsewhere. I again thank you for the compliment you have paid us, and can only assure you that as far as we have health, strength, and energy, we shall do as we have done for years past, devote ourselves to maintain and extend the prosperity of the company.

The proceedings then terminated.

BERLIN WATER-WORKS COMPANY, LIMITED.

The Nineteenth Annual General Meeting of the Shareholders of this Company was held at the London Tavern on Tuesday, Feb. 20—J. C. Pickersgill Cunliffe, Esq., in the chair.

The Secretary (Mr. Fesch) read the notice convening the meeting, and the following report, with the accounts, was presented:—

In submitting their usual half-yearly report to the shareholders of the Berlin Water-Works Company, the directors have much pleasure in stating that the receipts from the water-rates during the past half year show an increase upon those of the corresponding half year of 1870, to the extent of about £1800. This improvement would doubtless have been considerably greater, had it not been for the alteration which the company made in the tariff at the commencement of last year, whereby a considerable reduction was made in our charge for supplying water through meters. This, as was anticipated, reduced the annual payments of many of the householders who had previously been paying water-rates by a per centage on the assessed value of their houses; but the change has also resulted in reducing the previous excessive waste of water, which, if not checked, might have seriously affected the company's ability to supply any large increase in the number of their customers.

The net income of the company for the half year ending the 31st of December last amounts to £35,134 3s. 5d., which, added to the net earnings of the previous half year (say £34,761 18s.), makes the entire revenue for the year 1871, £69,896 1s. 5d.; and after paying 10 per cent. on the capital (say £60,000), there will be found a balance on the whole year of £9896 1s. 5d. Of this sum we reserve £4948 0s. 8d. for the Prussian Government, and carry the balance, £4948 0s. 9d., to the company's credit.

The result will be as follows:—Balance carried forward from the account made up to the 31st of December, 1870, £614 1s. 10d.; the shareholders proportion of earnings during the year 1871, £64,948 0s. 9d.; making together £65,562 19s. 7d.; less dividend for first half year, at the rate of 10 per cent. per annum, £30,000; leaving now available for dividend £35,562 19s. 7d. Out of this sum the board propose to declare a dividend at the rate of 11½ per cent. per annum, which will absorb £34,500, leaving a balance of £1062 19s. 7d. to be carried forward to the next account.

The increase in the working expenses has been caused, partly by the increase of the work done, but more especially by the rise in the price of coal and labour.

The board regret to announce that their esteemed colleague, Frederick Lokes Slous, Esq., has been compelled to resign his seat on account of serious illness. They have elected Sigismund Rücker, Esq., to be a director of the company in his place, subject to the confirmation of the shareholders at this meeting.

The retiring directors, John Cunliffe Pickersgill-Cunliffe, Esq., and Baron Victor de Magnus, and the retiring auditor, Frederick Gutteres Henriques, Esq., being eligible, offer themselves for re-election.

The Chairman, in moving the adoption of the report, said he had to express his regret at the absence of Mr. Sim, who would otherwise have presided over the meeting. There was fortunately little to say to the shareholders on the present occasion. The report informed them that the improvement in the revenue of the company would have been larger had it not been for the alteration made in the mode of supplying water to their customers. Instead of charging a per centage on the assessed value of the houses, the company now supplied water by meter. It might appear at first that they had, to a certain extent, sacrificed the interests of the shareholders to those of their customers by such an arrangement, but this was by no means the case. Under the old system the waste of water was so great that the company would soon have got to the end of their tether, and have had no means of giving a supply to new customers. In 1870, which was the year before the alteration took place, the quantity of water pumped into Berlin, with an increase of 315 consumers, was at the rate of 9 per cent. above the quantity pumped in during 1869; but in 1871, when the meter system came into operation, with an increase of 317 consumers, the additional quantity was only ½ per cent. The new arrangement was in most cases mutually satisfactory, and he was happy to say they had no arrears of water-rates. The capital of the company having been limited by themselves, the directors were unable to lay down mains into new localities, but looking forward to the time when the concession might expire, and the works of the company be purchased by the Government, they supplied new localities where the inhabitants were willing to pay for their own pipes, and in this way, during the past year, the pipe system had been extended 7194 feet. The expenses of the company in Berlin had increased during the year. In consequence of the derangement of traffic consequent on the war, the cost of coal had risen considerably; and Berlin being no longer regarded merely as the capital of Prussia, but as the capital of Germany, people flocked to the city, and it became an expensive place to live in. Wages had also increased, and the company's expenses were therefore heavier, but he thought they ought to be satisfied that after all there was an increase in their net revenue. At the latter end of last year an extraordinary meeting of the shareholders was held for the purpose of authorizing the extension of the capital, and the directors then stated that they should reserve that power in the hope of obtaining a fresh concession, or at any rate a favourable modification of the existing concession. He thought, however, that it might shortly be necessary to issue a small portion of the new capital for the purpose of constructing additional filters. The present filters were almost too small for the service of the company; and when repairs upon them became necessary, the engineer and manager, Mr. Gill, had no others to supply their place. The directors expected that they would have been permitted to follow the example of other companies in Prussia, and borrow money for the purpose, to be repaid to the lenders by instalments out of earnings during a certain period of time. But seeing that the Government had an interest in the surplus profits of this company above 10 per cent., the directors felt it their duty to ask permission before they so borrowed the money, which permission they had not yet obtained. Mr. Gill told them that the new filters were urgently required, and the directors had out of the small balance of capital at their disposal paid a certain amount on account for them. They had also resolved, in the event of not obtaining permission to borrow the necessary money in a short time, to call a special meeting, and ask for authority to raise £30,000, in 3000 £10 ordinary shares, to be allotted *pro rata* among the shareholders. With reference to the prolongation or alteration of the concession, no proposition had been made to the Government, the directors considering that the opportune moment had not arrived for so doing.

Mr. H. Goschen seconded the motion, and referred to the loss the company had sustained by the retirement of Mr. Slous, who was a most efficient director—one who was devoted entirely to the interests of the proprietors—and who worked in the greatest harmony with his colleagues during the whole of his official career. The board had elected Mr. Rücker to fill the vacant seat, and they asked the meeting to confirm their choice. Mr. Rücker was one of the oldest shareholders, was intimately acquainted with works of this character, and he (Mr. Goschen) was sure that his election would be a satisfaction to the company generally.

The motion was put, and carried unanimously.

The Chairman moved—"That a dividend for the half year ending the 31st of December last be declared at the rate of 11½ per cent. per annum, free of income-tax, payable on and after the 26th inst. to shareholders registered on the 10th instant."

Mr. Rucker seconded the motion, which was put, and carried unanimously.

The retiring directors were severally re-elected, and a vote of thanks was given to the chairman and directors for the able manner in which they had conducted the affairs of the company.

The Chairman acknowledged the vote.

A cordial vote of thanks was also given to Mr. Gill, the company's engineer and manager, which having been acknowledged by that gentlemen, the proceedings terminated.

Rochester Gas Company.—The half-yearly meeting of the shareholders of this company was held on the 15th inst.—Mr. J. Whittle, chairman of the board of directors, presiding. The report and statement of accounts for the past half year were unanimously adopted, and a dividend at the rate of 10 per cent. per annum on the old shares, and 7 per cent. on the new shares unanimously adopted. Alderman J. R. Foord, and Mr. J. Bratt, the retiring directors, and Mr. W. Homan, the retiring auditor, were unanimously re-elected. The directors and shareholders subsequently dined together at the Crown Hotel, Rochester Bridge, under the presidency of Mr. Whittle.

The Interdict against the Edinburgh Water Trustees.—On Wednesday, Feb. 7, their lordships of the First Division of the Court of Session heard parties in the reclaiming-note lodged on the part of the old Water Trustees against Lord Gifford's interlocutor. The hearing of the case occupied the whole of the sitting—Mr. Watson and Mr. Asher stating the case for the trustees, and the Solicitor-General and Mr. Macdonald for the respondents, Mr. Charles Cowan and others. The counsel went over pretty much the same arguments which were advanced in the case before Lord Gifford. For the reclaimers it was contended that a duty had been imposed upon them as Water Trustees—in so far at least as the domestic supply of water was concerned—to keep on a supply at high pressure, so as to give to every citizen a sufficient supply of pure and wholesome water for domestic uses, and that, in the event of their failing to do so they should become liable to certain specified penalties. It was argued that, if that were so, the statute imposed upon the trustees responsibilities from which they could not relieve themselves by saying that they had no water to give, that their resources were not sufficient for the increased population, and that they could not maintain a sufficient supply at high pressure for domestic uses. The reclaimers submitted to the court that, where a statute imposed a public duty upon a body corporate, under penalty for its non-discharge, such imposition implied that that body should take all necessary and proper steps for discharging said duty. The Water-Works Clauses Act, incorporated in the company's Act, and also in the Act of 1869, unqualifiedly laid upon the trustees the absolute duty of (1) providing a supply for the whole community within the limits of the Act, and (2) keeping that supply in the pipes and maintaining it up to a certain pressure in every house. The word was "provide," clearly implying that, if the existing sources did not admit of their keeping the necessary quantity in the pipes at the proper pressure, their duty was to procure as much water as would have that effect. And, apart from the statutory duty to provide such supply, the trustees, as part of their duty had to take all necessary steps for the defence of the subject matter of the trust, and were so entitled to charge against the rates the expense of promoting the bill in question. For Mr. Charles Cowan and others, it was argued that there was clearly no direct authorisation in any of the Acts referred to by the reclaimers empowering them to charge against the rates the expenses of the bill of 1870. And, in regard to the implied authorization alleged by the reclaimers, it was urged that the true interpretation of the clauses quoted as bearing on the subject of the domestic water supply was that the trustees were bound to give from their resources a supply of water to any inhabitant requiring it and willing to pay the rates therefor, and that such inhabitant was entitled to claim penalties against the trustees for their neglect or refusal to give such supply, except from causes beyond their control. But that neglect or refusal did not mean the not giving an increased supply other than the trustees were "enabled to provide" at the passing of the Act; and the penalty was exigible only in case of the trustees neglecting or refusing to properly store and distribute the supply which they were enabled to provide. Their lordships took time to consider the case.

METROPOLIS GAS SUPPLY.

Metropolitan Board of Works.

At the Meeting of the Board on Friday, Feb. 16—Colonel Hogg, M.P., in the chair,

The Solicitor reported on the bills affecting the metropolis now before Parliament.

On the South London Gas Bill being named,

Mr. Dresser Rogers said he considered that the rights of the public were about to be infringed by the amalgamation of the Phœnix and South Metropolitan Gas Companies under the bill.

Mr. Dalton said the Parliamentary Committee had invited the districts affected to state their views to the board, in order that the board might know what was wanted.

Mr. Richardson said the Phœnix Company charged two prices in the two different areas supplied by that company—one price in the town area, and another in the suburban area.

Mr. Newton said it was open to question whether the board, as representing the whole metropolis, should insist on different areas supplied by one company. The South Metropolitan Company was a particularly favoured company, because, having a small capital, its expenses were not so great as those of companies with a larger capital. The South Metropolitan price was 3s. 2d., and the price of the Phœnix had been 4s., and was now 3s. 9d. The board, it should be remembered, represented the metropolis, and not one section only; and if one district suffered a little, and another gained a little, it perhaps, as a matter of principle, did not affect the metropolis as a whole. But the Parliamentary Committee would consider the question as a whole, and all he was anxious to do was to prevent the board being led away by those interested only on one side of the question.

On the motion of Mr. Dresser Rogers, seconded by Mr. Fowler, the solicitor was directed to supply a copy of the South London Gas Bill to the members.

At the meeting on Friday, Feb. 23,

Mr. Dalton brought up the report of the Parliamentary Committee, stating that they have given instructions for two counsel to be retained for the board in the matter of the South London Gas Bill and the Gaslight and Coke Company's bill. Mr. Dalton said that a very strong memorial had been addressed to the Parliamentary Committee against the South Metropolitan Gas Bill, and the committee, thinking it proper to hear all parties interested, had invited opinions from the various district boards and vestries as well as from the gas companies. The committee felt that it was utterly impossible for them to make any definite report to the board until they had heard all parties.

Mr. Newton said there were many clauses in the bill which ought to be opposed on the second reading, but that was a very different thing from objecting to the principle of the bill.

Mr. Legg thought that if a clause were inserted stipulating that the price of gas should not be above the present price it would meet the difficulty. They were extremely well served in Bermondsey, Wandsworth, and Camberwell; and he believed that the proposed amalgamation would tend to reduce the price of gas, and, therefore, he did not think they should throw unnecessary obstacles in the way of the bill.

Mr. Lloyd said the question was whether objection should be taken to the second reading of the bill. The committee did not object to the principle of amalgamation, but wished to secure that all the advantages at present given by the old Acts under which the companies were formed should be continued under the new bill.

Mr. Fowler said this was a matter of great importance, and would, no doubt, receive the serious attention of the committee; but the South Metropolitan Bill was a very extraordinary one, and would excite the strongest possible opposition in the south of London. In the absence of any definite report as to what steps the board intended to take, the only thing to do was to be armed at all points in case it was necessary to oppose the bill.

Mr. Sanders said that an important principle was involved in this matter. The Parliamentary Committee was appointed originally only to carry bills through Parliament, but unfortunately it had got into the method of dealing with these larger questions of policy, which really ought to be considered by a committee of the whole board. He felt that this question was so important that he should at some future time have to move that the Parliamentary Committee be a committee of the whole board, because he believed the powers possessed by the Parliamentary Committee at present were greater than ought to be entrusted to them.

Mr. Dresser Rogers quite agreed with what Mr. Sanders had said, and the earlier Mr. Sanders presented his motion the better for the ratepayers of London. He thought it improper that the committee should receive deputations, and perform the functions of the board. The South London district would be very much prejudiced by the operation of the Act. He thought the board ought to know the nature of the report of the committee before they employed counsel. If the board pledged itself to a course of action now, they would not be able afterwards to restrain the action of the Parliamentary Committee. In regard to this particular bill, he was afraid, if care were not taken, that it would be too late to oppose it.

Mr. Dalton replied that if the members had understood this question they would not have made those remarks. The committee acted as a sort of jury, to hear all parties, and when they had done so they would make their report, but would take no action for or against the bill without the distinct instructions of the board. The Parliamentary Committee, however, had no power to do so without the authority of the board. All they wished to do was to investigate and report, and then take the direction of the board.

The report was then agreed to.

Lambeth Vestry.

At the Meeting of the Vestry on Thursday, Feb. 15—Mr. Hill in the chair, the Parliamentary Committee brought up a report, recommending—"That the vestry authorize a petition to be presented against the bill on its demerits, and that the vestries of Camberwell and Newington be requested to co-operate in such opposition, and bear proportionate parts of the expenses thereof, and in the event of failure of co-operation by such vestries, that a petition be presented by the vestry to protect the interests of the ratepayers."

Mr. F. H. Fowler, in moving the adoption of the report, said he need not remind the vestry of the importance of the question to the consumers and to the parish of Lambeth. The Phœnix Company was an old one, but the South Metropolitan was comparatively new, and as far as the gas supplied by the latter went, he might say that it was the best and cheapest of any in the metropolis. The committee did not go so far as to say that amalgamations between gas companies were bad—there might, indeed, be some advantages—but the main question which they kept before them was that the new bill set aside all the important advantages over which so much money and time had been spent.

Mr. Barker: What are they?

Mr. Fowler said that if Mr. Barker desired he would go into the question. He might say that he referred to the Metropolis Gas Act. This Act gave the ratepayers some power over the gas companies in the way of better illuminating power and better supply. Besides which there was another important power, which was that if any company made a profit large enough to pay a certain dividend and to leave a surplus, that surplus was to be applied to the reduction in the price of gas. That was law, but he could not say that it was carried out. The present bill, however, proposed to set aside all these advantages. He did not wish to say anything about the price of gas supplied by these companies. The Phœnix, he believed, charged 3s. 9d., but the Metropolitan only charged 3s. 2d., and managed their affairs so well that they not only paid 10 per cent., but had got sufficient surplus to pay another 10 per cent. Rather than reduce the price of gas, however, they preferred to make a financial operation, and the ratepayer would have an amalgamated capital instead of a reduction. For 20 years the ratepayers had been contending against the companies, and, as a rule, the latter managed to get the best of it, but now that advantages were given to the former, the latter endeavoured by a side-wind to get over them.

Mr. T. Harvey seconded. There was no doubt that the amalgamation meant to subtract from the ratepayers pockets.

Mr. P. M. Hart inquired of Mr. Roffey whether the bill had been opposed on Standing Orders.

Mr. Roffey said it had been decided to ask for the co-operation of the vestries of Newington and Camberwell, and that was not obtained in time to enable them to do so.

The resolution was carried.

Camberwell Vestry.

The Adjourned Vestry of the Parish of St. Giles, was held on Wednesday, Feb. 23, Mr. Turney in the chair.

Mr. Dresser Rogers again brought under the notice of the vestry the proposition of the South London Gas Companies to amalgamate with each other. As representing the consumers of gas, they had to ask themselves whether the amalgamation was necessary. However necessary it might be to the companies themselves, it certainly was not required by the consumers, whom it must affect very prejudicially. The parish of Camberwell was mainly supplied by the South Metropolitan Gas Company, whose capital amounted to only £250,000, whilst that of the Phœnix Gas Company amounted to £800,000. In the case of the South Metropolitan Gas Company, the price of gas was 3s. 2d. per 1000 cubic feet, and considering the amount of profit the company made they would be justified in reducing the price to 2s. 8d. per 1000 feet. The bill, if passed, would enable the amalgamated companies to charge 3s. 6d. per 1000 feet. That was not all. It would enable them also to pay 10 per cent. on the Phœnix capital as well as the South Metropolitan capital before they reduced the price. It would be necessary for this vestry to be united and determined in opposing the bill, otherwise they would become saddled with an incubus of which it would be impossible afterwards to rid themselves. On the present occasion his only object was to report that he believed the Metropolitan Board of Works would join with them in opposing the bill, and that already Lambeth, Wandsworth, and other parishes were beginning to move in the matter.

IMPERIAL GASLIGHT AND COKE COMPANY.

The Ordinary Half-Yearly General Meeting of the Proprietors of this Company was held at the Offices, John Street, Bedford Row, on Thursday, Feb. 22—Edward Vaughan Richards, Esq., Q.C. (the governor), in the chair.

The Secretary (Mr. Harry Chubb) read the advertisement convening the meeting; the corporate seal was affixed to the register of proprietors, and the following report and statements of account were presented:—

The directors herewith present to the proprietors the annexed accounts, which exhibit in detail the transactions of the company during the half year ending the 31st of December last, and show an available balance of £89,472 3s. 7d.

The sum required to pay dividends at the prescribed rates on the company's stock and share capital amounts to £95,063 2s. 10d; consequently, the sum of £5590 19s. 3d. must, on the present occasion, be drawn from the reserve-fund, which, as the proprietors are aware, now stands at its maximum.

Like most other large manufacturers, the directors have found themselves called on to consent to a considerable increase in the wages of their workmen. They are happy to state that the new scale of pay has been settled on terms satisfactory to the men, and which, under the circumstances, have not appeared to be unfair to the company.

During this winter two out of the three manufactories of the company have been worked at very nearly their full maximum productive power. They will not admit of being enlarged to any important extent, whilst the ordinary rate of increase in the demand upon the company for gas indicates that 2 millions of cubic feet per diem may be required in the depth of next winter in excess of the daily demand in December last. To meet this expected increase the directors are pressing forward towards completion such portion of the new works as will enable them to provide from thence enough gas to supply the anticipated excess.

Anxious attention has been bestowed on the mode in which the land upon which these new works are being erected could best be laid out. They are designed to meet a considerably increasing demand for many years to come, and will eventually be of great magnitude. It is, therefore, of prime importance that they should be arranged on the most perfect system which experience can suggest with a view to economy of manufacture in the first instance, and extension in the future. In this important task the directors are being most ably assisted by their engineers, Mr. Joseph Clark and Mr. T. N. Kirkham, to whose joint care they have confided the charge of designing and superintending the construction of the extensive works already undertaken.

The site selected for the new works forms part of the West Ham Marshes, in Essex. It is bounded by the Tilbury Railway on the north, and the North Woolwich Railway on the east, and it has a frontage of about 5000 feet on Bow Creek, which is here a tidal stream navigable by barges, and is subject to no tolls or dues of any kind. The distance of the company's land from the Thames at Blackwall, into which Bow Creek flows, is about 1½ mile.

Nearly 150 acres of this marsh land have been secured after much difficulty, and works of considerable magnitude have been already constructed, or are now in course of erection thereon.

It was necessary to erect a somewhat costly bridge over the river Lea and Bow Creek, not only for the purpose of opening a direct communication between the company's works and the Middlesex side of the river Lea, but also for carrying the large mains by which the gas is to be conveyed to the districts in which it is required. This bridge, which has been constructed under the able superintendence of Mr. P. W. Barlow, C.E., and to the satisfaction of the River Lea Conservancy, is now quite finished, and appears to be well calculated to answer the purposes for which it was intended.

Two tanks, for gasholders capable of storing 2 millions of cubic feet of gas each, are also finished, and three more of similar size are constructing. A dock, 1000 feet long by 100 feet wide, with a lock from Bow Creek, is likewise complete. The wing walls at the entrance to this dock and the river wall, which for some yards extends along the bank of Bow Creek, are costly undertakings; they will soon be finished, and the communication between the river and the dock, which will then be established will immediately afford great accommodation in unloading materials required at the new works.

Two retort-houses, each capable of producing 2½ million cubic feet of gas in a day, and with coal-stores attached, are advancing towards completion. Gasholders, exhauster-houses, purifying-tanks, and all other necessary works connected with the manufacture of gas, have been put in hand under contracts with builders and manufacturers of high character.

A main, 4 feet in diameter, has been laid down for about four out of the six miles along which it is considered necessary at present to lay one. And with due regard to the risk of depending entirely upon a long line of single pipe, as well as in anticipation of the demands of no distant future, a second main has been laid down in several places where it appeared that increased difficulties and expense might be incurred by postponement.

The capital expended in works and mains of such an extensive character and size as those described in this report cannot, of course, become fully remunerative until a large quantity of gas is manufactured at the new station, but your directors are satisfied that it is sound policy to conduct their operations in the first instance on a scale suited to the demand which experience has taught them a few years will develop, rather than, in a spirit of false economy, to erect works and lay down mains which the increasing requirements of their extensive business will rapidly render inadequate to the supply of gas required.

It is with regret the directors have to announce the death of Mr. Thomas Yates, one of the company's auditors, who has filled that office for the last 44 years. It will be for the proprietors to consider whom they will elect as his successor.

IMPERIAL GASLIGHT AND COKE COMPANY.

Statements of Account for the Half Year ending December 31, 1871.

No. 1.—STATEMENT OF STOCK AND SHARE CAPITAL, *on December 31, 1871.*

Acts of Parliament authorizing the Raising of Capital.	Description of Capital.	Maximum Dividend authorized.	No. of Shares issued.	Nominal Amount of Share.	Called up per Share.	Total paid up.	Amount issued but not paid.	Remaining to be issued and called up.	Total Amount authorized.
17 Vict., cap. 55.	Stock.	10 per cent.	..	..	..	£1,560,000	..	..	£1,560,000
29 & 30 Vict., cap. 352.	Share.	7 Ditto.	26,000	£12 10 0	£12 10 0	325,000	..	..	325,000
32 & 33 Vict., cap. 128.	Ditto.	7 Ditto.	26,000	12 10 0	7 10 0	194,985	£15	£780,000	975,000
						£2,079,985	£15	£780,000	£2,860,000

No. 2.—STATEMENT OF LOAN CAPITAL, *on December 31, 1871.*

Acts of Parliament authorizing the Loan Capital.	Description of Loan.	Rate per Cent. of Interest.	Total Amount borrowed, Dec. 31, 1871.	Remaining to be borrowed.	Total Amount authorized.
17 Vict., cap. 55.	Bonds for profits capitalized.	10 per cent.	£130,000	..	£130,000
	Debentures	4 to 5 ditto.	43,000	..	43,000
29 & 30 Vict., cap. 352.	Ditto	Ditto.	81,250	..	81,250
32 & 33 Vict., cap. 128.		..	..	243,750	243,750
			£254,250	£243,750	£498,000

No. 3.—CAPITAL ACCOUNT.

To Expenditure, to June 30, 1871			£2,085,109 10 7	By		Certified Receipts to June 30, 1871.	Received since that date.	Total Receipts to Dec. 31, 1871.
Since that date—					Consolidated Stock (1871)	£1,560,000 0 0	..	£1,560,000 0 0
Land	£2,289 15 3				Ditto £12 10s. Shares (1866)	325,000 0 0	..	325,000 0 0
New buildings and machinery in extension of works	74,551 4 5				Ditto £12 10s. ditto (1870)	129,992 10 0	64,992 10 0	194,985 0 0
New and additional mains and services	32,163 6 3					£2,014,992 10 0	£64,992 10 0	£2,079,985 0 0
		109,004 5 11			Bonds for capitalized profit	130,000 0 0	..	130,000 0 0
Total expenditure		£2,194,113 16 5			Debentures	124,250 0 0	..	124,250 0 0
Balance		140,121 3 6				£2,269,242 10 0	£64,992 10 0	£2,334,235 0 0
		£2,334,235 0 0						

No. 4.—REVENUE ACCOUNT.

To Manufacture of gas—				By Sale of gas—			
Coals, including dues, carriage, unloading, &c.	£152,303 2 2			Per meter (1,493,080,000 cubic feet)	£272,392 1 7		
Purifying materials, oil, and sundries	3,464 5 11			Public lighting and under contracts	35,217 11 6		
Salaries of engineers and officers at works	1,997 10 0					£307,609 13 1	
Wages (manufactory)	25,077 17 2			Meter-rental		7,081 16 7	
Repairs and maintenance of works and plant, machinery, apparatus and tools, materials and labour—less £968 18s. 11d. received for old materials	50,428 11 10			Residual products—			
		£233,271 7 1		Coke, less charges, and £2322 16s. 9d. loss on breeze	50,798 13 1		
Distribution—				Tar	6,174 7 10		
Salaries and wages of officers connected with distribution	4,562 6 1			Ammoniacal liquor	4,528 11 3		
Repairs, maintenance, and renewals of mains and services, including materials, paving, and labour	4,119 10 2					61,501 12 2	
Meters—repairs and renewals	4,886 1 3			Rents receivable		718 17 6	
		13,567 17 6		Transfer fees		40 0 0	
Public lamps—							
Lighting and repairing		6,803 3 0					
Rents, rates, and taxes—							
Rents payable	1,232 13 2						
Rates and taxes	8,113 8 5						
		9,346 1 7					
Management—							
Directors allowance	£2,000 0 0						
Company's auditors	78 15 0						
Salaries of secretary, accountant, and clerks	4,477 7 0						
Collectors commission	4,485 4 1						
Stationery and printing	1,437 14 0						
General charges and incidentals	1,425 9 6						
		13,904 9 7					
Law charges		187 14 6					
Bad debts		3,672 13 8					
Gas referees and official auditor	691 15 5						
Public testing-offices	286 1 10						
		977 17 3					
Total expenditure		281,781 4 2					
Balance, carried to profit and loss account (No. 5)		95,220 15 2					
		£376,951 19 4				£376,951 19 4	

No. 5.—PROFIT AND LOSS ACCOUNT (NET REVENUE).

To Interest on bonds and debentures, to Dec. 31, 1871	£9,272 12 9		By Balance from last account	£94,869 7 2
Ditto on temporary loans	83 9 8		Less dividend for the half year ending June 30, 1871	93,543 5 0
Balance	89,472 3 7			£1,326 2 2
			Amount from Revenue Account (No. 4)	95,220 15 2
			Interest on moneys deposited	174 7 8
			Dividends on reserved and contingency funds, invested in Consols.	2,107 1 5
	£98,828 6 0			£98,828 6 0

No. 6.—RESERVED FUND.

To Balance	£81,250 0 0	By Balance from last account	£81,250 0 0

No. 7.—CONTINGENCY-FUND.

To Balance	£50,000 0 0	By Balance from last account	£50,000 0 0

No. 8.—STATEMENT OF COALS.

Description of Coal.	In Store, July 1, 1871.	Received during Half Year.	Carbonized or used during Half Year.	In Store, Dec. 31, 1871.
	Tons.	Tons.	Tons.	Tons.
Newcastle	10,378	194,423	182,718	22,083
Cannel	3,617	9,274	10,719	2,172
	13,995	203,697	193,437	24,255

No. 9.—STATEMENT OF RESIDUAL PRODUCTS.

Description of Residual.	In Store, July 1, 1871. Estimated.	Made during Half Year. Estimated.	Used in Manufacture during Half Year. Estimated.	Sold during Half Year.	In Store, Dec. 31, 1871. Estimated.
Coke—chaldrons of 36 bushels	3,350	193,808	49,475	139,955	7,728
Breeze—chaldrons	621	22,204	..	21,370	1,455
Tar—gallons	257,322	1,711,130	140,264	1,470,020	358,168
Ammoniacal liquor—butts of 108 gallons	1,788	22,823	..	22,869	1,742

No. 10.—BALANCE-SHEET.

To Capital, for balance per account (No. 3)	£140,121	3	6	By Amount invested in Three per Cent. Consols—		
Treasurer for amount received on calls made on £12 10s. shares (1870)	28,490	0	0	Reserved fund	£81,250	0	0
Treasurer for loan	10,000	0	0	Contingency-fund	50,000	0	0
Reserved fund, for amount of account (No. 6)	81,250	0	0	Cash at bankers	39,537	7	8
Contingency-fund, ditto (No. 7)	50,000	0	0	Gas and meter rental, for amount due to company, to Dec. 31, 1871	223,939	14	10
Interest due to Dec. 31, 1871, on bonds and debentures	9,272	12	9	Coke and other residuals, ditto	10,403	4	11
Sundry tradesmen and others, for amount due for coals, stores, &c., to Dec. 31, 1871	45,956	18	9	Sundry accounts, ditto	5,719	1	11
Profit and loss, for balance of account (No. 5)	89,472	3	7	Coals, for stock on hand	20,372	5	9
				Coke, ditto	2,847	13	6
				Tar and ammoniacal liquor, ditto	1,757	2	7
				Sundry stores, ditto	18,736	7	5
	£454,562	18	7		£454,562	18	7

I have examined the above accounts, and certify them to be correct. W. HAWES, *Auditor*.
I hereby certify that the above accounts are correct, and that there are no losses or forfeitures to be deducted.
CHAS. H. PARKES, *Official Auditor*.

The GOVERNOR: Gentlemen, my first duty is to move the adoption of the report, and in doing so I shall, as usual on these occasions, have the honour to address to you a few remarks. You will have, no doubt, observed by the report that we have been obliged to draw upon the reserve-fund to the extent of £6000, in round numbers, in order to pay you the maximum dividend to which you are entitled by Act of Parliament. This is a result which was not altogether unforeseen by us at the time we effected the last reduction in the price of gas, but since that period there has been a considerable advance throughout the country in the rate of wages, and also an important rise in the price of coal. I mention these facts because I think it is extremely probable that on the next occasion we may be again compelled to take something from the reserve-fund. You are also aware that, in addition to the causes I have mentioned, considerable sums of money have been expended by us upon our new works at Bromley, and the capital so invested requires a certain length of time before it becomes remunerative. These are circumstances which you must bear in mind. On the other hand, looking at the accounts, you will see that we spent a large sum of money on wear and tear both last half year and the half year previously. This is one of those heads of expenditure in which we may naturally expect to effect a considerable saving, and any economy in this respect will go to increase the balance of profit and loss from which you receive your dividend. I think we shall find this will be the case next half year. The accounts you have before you disclose the financial position of the company in such detail that it would be mere pedantry on my part to attempt to discuss the matter, though I may say that I shall be extremely happy to answer any question regarding them, or to explain any point which you may think requires elucidation. There is one subject to which I might refer, because I think it is almost certain, and that is, that we shall make a call of £2 10s. per share on the new shares in the month of August next, which will be the final call on our present issue. Another thing I may tell you also—viz., that it is probable—though to this you must distinctly understand I do not pledge myself—before the end of the year we shall issue a fresh batch of shares. That cannot be done without the assent of a general meeting, and it will have to be discussed at our meeting in August next. I merely mention it now that you may have the very earliest information; in fact, as early as we have ourselves, for it has been scarcely mooted amongst us yet. The next matter I allude to is that of Parliament. We congratulate ourselves extremely that there is no bill before the Legislature this year which at all interferes with the Imperial Gas Company; and that for the present at least we are mercifully spared from the paternal attentions of the Board of Trade. I pass from that subject to that which occupies the largest portion of our report to-day—the progress of our new works at Bromley. We have given you an account of this progress, however, in such detail that it is scarcely necessary for me to occupy much time in referring to it. The land marked in the map before me pink and brown, is the land we possess. It lies immediately on the east side of Bow Creek, which at that particular point runs close to and parallel with the canalized portion of the river Lea. Over these we have thrown a bridge, using the tongue of land between them as the support for the centre pier. This bridge is a solid, handsome structure, and extremely well adapted for the purpose intended. It has been erected under the superintendence of Mr. Peter Barlow, and is now quite finished. We believe that our own engineers, Mr. Clarke and Mr. Kirkham, were perfectly competent to erect this bridge, but you must bear in mind that it was required to be carried over two water-ways, and it appeared to us that if by any chance an accident should arise in its construction the public might turn round and accuse us of something like negligence for not employing an engineer whose speciality was the construction of bridges, and that we should not be able to justify ourselves for employing gentlemen who, however eminent they might be as gas engineers, had no speciality in bridge-building. We are erecting, or rather sinking, five gasholder-tanks, into two of which we propose shortly to put gasholders. These tanks have been constructed under the superintendence of Messrs. John Aird and Son, who are large contractors, and have done a great amount of work for us in a most satisfactory manner on many occasion. On another portion of the land towards the south Messrs. Thomas Docwra and Co. have just constructed for us a large dock, 1000 feet long by 100 feet wide, with a lock from Bow Creek, and this dock when filled with water will be capable of floating about forty barges. These things are designedly carried out on a very large scale, in order that they may be sufficient for our purpose when our works are in full operation there. We are constructing one large double retort-house capable of producing 5 million cubic feet of gas per day alongside the dock. In the course of time we shall erect another retort-house of similar capacity on the same side, and at some future period there will be other retort-houses of the same kind on the opposite side, so that we may hope hereafter my successor's successor will have to congratulate your children's children on the completion of these magnificent works. If any of the shareholders feel disposed to encounter the journey, they will find that an inspection of the works will well repay them. The bridge alone is well worth going to see; it would do justice to a county town. Its construction was not only necessary in order to give us a direct communication with our works, but also for carrying our 48-inch main from those works, and connecting it with the main of similar capacity, which conveys the gas thence into the districts where it will be supplied. I am sure that those who do visit the place will be struck not only with the extent of the work, but also with the admirable way in which it has been carried out. Very soon we shall be able to open the connexion between Bow Creek and the dock. The wing walls at the entrance are complete, and we are now constructing a short length of river wall, and when the whole is finished we shall have as commodious a dock as any in the United Kingdom. Gentlemen, I think this is all I have to say to you, except that there will be one subject for discussion hereafter—viz., the appointment of an auditor in the place of the late Mr. Yates. That is not a subject in which we, on this side of the table, take any part. The question is one entirely for the shareholders, and to them we leave it. I propose—"That the report of the directors now presented, together with the statement of accounts, be approved and entered on the minutes."

The DEPUTY-GOVERNOR (Mr. Barclay Farquharson Watson) seconded the motion, which was put, and carried unanimously.

The GOVERNOR moved—"That the following dividends be now declared out of the net profits of the undertaking for the half year ending Dec. 31st last—viz., at the rate of 10 per cent. per annum on £1,660,000 consolidated stock; at the rate of 7 per cent. per annum on 26,000 £12 10s. shares (1866), fully paid, and on 26,000 £12 10s. shares (1870), £5 per share paid from the 1st of July to the 30th of Sept., and £7 10s. per share paid from the 1st of Oct. to the 31st of Dec.; and that the dividends as above be made payable on Friday, the 1st of March next."

The DEPUTY-GOVERNOR seconded the motion, which was carried unanimously.

The GOVERNOR moved, and the DEPUTY-GOVERNOR seconded, the re-election of Mr. James St. George Burke, Q.C., one of the retiring directors, which was agreed to.

On the motion of the GOVERNOR, seconded by Mr. BURKE, Lieut.-Col. Creed was re-elected a director.

On the motion of the GOVERNOR, seconded by Lieut.-Col. Creed, Lord Alfred Paget was re-elected, and

On the motion of the GOVERNOR, seconded by Lord Alfred PAGET, Mr. Meaburn Staniland was re-elected a director.

A PROPRIETOR, observing that the directors had been obliged to resort to the reserve-fund in order to make up the dividend, inquired the reasons which led them to make a reduction in the price of gas at the time it was made.

The GOVERNOR said it was made for the very simple reason that the directors believed at the time that they could afford it, and they felt that the public were entitled to a reduction of price immediately the company could afford it. Since that reduction, however, a great rise had taken place in the rate of wages and in the cost of coal, and it remained to be seen whether the present low price for gas can be continued.

Another PROPRIETOR inquired whether the price of gas could be raised again to its former standard.

The GOVERNOR said that was a legal question upon which opinions might differ. His own view was that the price having been voluntarily reduced could unquestionably be raised within the limit of 3s. 9d. There was also machinery provided by statute for raising the price even higher under certain contingencies. In answer to further questions, the governor said the company had above 70,000 customers, and it was natural to suppose, in the present state of human nature, that in that number would be found a certain per centage of grumblers. He believed, however, that in every portion of the company's district there was an ample supply of gas, and that, if any deficiency was experienced, it arose entirely from the consumers defective fittings. The company were not in the least dependent upon the new works for the supply of existing customers; but they expected to obtain additional customers every year, and it was in view of that contingency that they were pressing forward the completion of the new works, which he hoped would be in such a condition next November as to furnish two million feet of gas a day In many parts of the company's district new houses were springing up like mushrooms, and they must be prepared to give them a supply when required, as, indeed, they were compelled by law to do.

General DUKE proposed Mr. Arthur Hall as a fit and proper person to fill the office of auditor, vacant by the decease of Mr. Yates.

Mr. SAPTE seconded the motion.

Mr. PAINE proposed Mr. Robert Stanley Mansel for the office.

Mr. CORY seconded the motion.

On a show of hands, Mr. Mansel was elected auditor by a large majority.

A cordial vote of thanks was given to the governor, deputy-governor, and directors for their able management of the company's affairs.

The GOVERNOR acknowledged the vote, and the proceedings terminated.

BRADFORD CORPORATION GAS-WORKS.

The Quarterly Meeting of the Bradford Town Council was held on Tuesday, Feb. 13—the MAYOR (Mr. Thompson) presiding.

The MAYOR, in moving a resolution approving of estimates for, and adopting necessary steps for making and levying a borough-rate, general district-rate, lamp-rate, and water-rate, entered into elaborate details of the financial position of the corporation. The total of the rates to be levied was 3s. 5d. in the pound, as against 3s. 7d. last year. The amount would have been much more considerable if there had not been £12,500 taken from the gas profits in relief of rates. The gas account ought to have appeared in the report on the rates in the same way as other accounts appeared, but owing to various reasons they had not been able to prepare it. In future years it would appear along with the others. On the gas account, the corporation had power to borrow £260,000, and had actually borrowed £212,628 15s. 5d. on the purchase of the gas-works, and by the agreement the corporation became entitled to a balance of profits on the half year's account ending June 30th, amounting to £9835 3s. 8d. On the half year's trading ending December 31st last, after deducting income-tax and the interest on money borrowed, the net profits were £9977 10s. 6d. This and the balance of the preceding half year amounted together to £19,812 14s. 2d. He did not propose to deal with that sum at all. The council would dispose of it on some future occasion, in accordance with the provisions of the Act of Parliament under which the gas-works were purchased. It belonged to a year in which he was not their financial secretary. As to the estimates for the year 1872, he was not prepared, for reasons which he need not detain the council with, to give a satisfactory statement, but if he took the net profits to be the same as last year's—£19,812 14s. 2d.—and deducted therefrom £2130 for sinking-fund, and £12,500 which he had already proposed to take in relief of rates, there would be left £5182 14s. 2d. to be otherwise disposed of.

Alderman LAW seconded the motion.

Alderman M. DAWSON said in Manchester, as they would be aware, the resources from the gas-works were devoted to the improvement of the town. With reference to £4500 of the gas profits being added to the general district account, and £8000 to the borough-fund account, he objected on principle to gas profits going to the relief of the rates of the borough. He thought, as in Manchester, the profits which might accrue from the gas-works should be devoted exclusively to the improvement of the town of Bradford, or to the reduction of the price of the gas, after they had made a better quality of gas than they had at present. He was anxious that they should have a better quality of gas in Bradford than in any borough in the north of England. Hitherto the managers of the gas-works had had a considerable difficulty before them—the difficulty of getting a suitable class of coals. The profits accruing from the gas-works should go exclusively to the improvement of the borough and not to the reduction of the rates, because it was not right or just that people who happened to be large consumers of gas should have to pay more than their fair share of taxation by the price of gas being kept at a higher figure than it could be made for. If a similar proposition was made at any future time he should feel it his duty to oppose it.

Mr. WAUD expressed his total disagreement with the remarks of Alderman Dawson. He contended that in view of the fact that for years past the streets had been incessantly torn up by the gas company for the purpose of laying their mains, it was only fair to appropriate a portion of the gas profits to the expenditure of the Street and Drainage Committee.

The motion was then carried.

It was also resolved, in accordance with a recommendation of the Finance and General Purposes Committee, that, in pursuance of the Bradford Corporation Gas and Improvement Act, 1871, the council do apply out of surplus profits arising from the gas-works, the sum of £12,500 for the street improvements of the borough, and that of such sum, £4500 be placed to the credit of the general district-rate account, and £8000 to the borough-fund account.

ON THE INFLUENCE OF GAS AND WATER PIPES IN DETERMINING THE DIRECTION OF A DISCHARGE OF LIGHTNING.

By HENRY WILDE, Esq.

[A paper read before the Manchester Literary and Scientific Society, Jan. 9, 1872.]

Although the invention of the lightning conductor is one of the noblest applications of science to the wants of man, and its utility has been established in all parts of the world by the experience of more than a century, yet a sufficient number of instances are recorded of damage done by lightning to buildings armed with conductors to produce, in the minds of some, an impression that the protective influence of lightning conductors is of but questionable value.

The destruction by fire of the beautiful church at Crumpsall during a thunderstorm, on the morning of the 4th inst., has induced me to bring before the society, with a view to their being known as widely as possible, some facts connected with the electric discharge which have guided me for some years in the recommendation of means by which disasters of this kind may be averted.

For the proper consideration of this subject it is necessary to make a distinction between the mechanical damage, which is the direct effect of the lightning stroke, and the damage caused indirectly by the firing of inflammable materials which happen to be in the line of discharge.

Instances of mechanical injury to buildings not provided with conductors are till sufficiently numerous to illustrate the terrific force of the lightning stroke, and at the same time the ignorance and indifference which prevail in some quarters with respect to the means of averting such disasters; for wherever lofty buildings are furnished with conductors from the summit to the base, and thence into the earth, damage of the mechanical kind is now happily unknown.

Even in those cases where lightning conductors have not extended continuously through the whole height of a building, or where the lower extremity of the conductor has, from any cause, terminated abruptly at the base of the building, the severity of the stroke has been greatly mitigated, the damage being limited, in many cases, to the loosening of a few stones or bricks.

The ever extending introduction of gas and water pipes into the interior of buildings armed with lightning conductors has, however, greatly altered the character of the protection which they formerly afforded, and the conviction has been long forced upon me that, while buildings so armed are effectually protected from injury of the mechanical kind, they are more subject to damage by fire.

The proximity of lightning conductors to gas and water mains, as an element of danger, has not yet, as far as I know, engaged the attention of electricians, and it was first brought under my notice at Oldham in 1861, by witnessing the effects of a lightning discharge from the end of a length of iron wire rope, which had been fixed near to the top of a tall factory chimney, for the purpose of supporting a long length of telegraph wire. The chimney was provided with a copper lightning conductor, terminating in the ground in the usual manner. In close proximity to the conductor, and parallel with it, the wire rope descended from near the top of a chimney, for a distance of 100 feet, and was finally secured to an iron bolt inserted in the chimney about 10 feet from the ground. During a thunderstorm which occurred soon after the telegraph wire was fixed, the lightning descended the wire rope, and, instead of discharging itself upon the neighbouring lightning conductor, darted through the air for a distance of 10 feet to a gas-meter in the cellar of an adjoining cotton warehouse, where it fused the lead pipe connexions and ignited the gas. That the discharge had really passed between the end of the wire rope and the lead pipe connexions was abundantly evidenced from the marks made on the chimney by the fusion and volatilization of the end of the wire rope, and by the fusion of the lead pipe. As the accident occurred in the daytime, the fire was soon detected and promptly extinguished.

Another and equally instructive instance of the inductive influence of gas-pipes in determining the direction of the lightning discharge occurred in the summer of 1863 at St. Paul's Church, Kersal Moor, during divine service. To the outside of the spire and tower of this church a copper lightning conductor was fixed, the lower extremity of which was extended under the soil for a distance of about 20 feet. The lightning descended this conductor, but instead of passing into the earth by the path provided for it, struck through the side of the tower to a small gas-pipe fixed to the inner wall. The point at which the lightning left the conductor was about five feet above the level of the ground, and the thickness of the wall pierced was about four feet; but beyond the fracture of one of the outer stones of the wall, and the shattering of the plaster near the gas-pipe, the building sustained no injury.

That the direction of the electric discharge had in this case been determined by the gas-pipes which passed under the floor of the church was evident from the fact that the watches of several members of the congregation who were seated in the vicinity of the gas-mains were so strongly magnetized as to be rendered unserviceable.

The church at Crumpsall is about a mile distant from that at Kersal Moor, and the ignition of gas by lightning, which undoubtedly causes its destruction, is not so distinctly traceable as it is in other cases which have come under my observation, because the evidences of the passage of the electric discharge have been obliterated by the fire. From information, however, communicated to me by the clerk in charge of the building, as to the arrangement of the gas-pipes, the most probable course of the electric discharge was ultimately found.

The church is provided with a copper lightning conductor, which descends outside the spire and tower as far as the level of the roof. The conductor then enters a large iron down-spout, and from thence is carried into the same drain as that in which the spout discharges itself. Immediately under the roof of the nave, and against the wall, a line of iron gas-pipe extended parallel with the horizontal lead gutter which conveyed the water from the roof to the iron spout in which the conductor was enclosed. This line of gas-piping, though not in use for some time previous to the fire, was in contact with the pipes connected with the meter in the vestry where the fire originated, and was not more than three feet distant from the lead gutter on the roof. As no indications of the electric discharge having taken place through the masonry were found, as in the case of the church at Kersal Moor, it seems highly probable that the lightning left the conductor at the point where the latter entered the iron spout, and by traversing the space between the leaden gutter and the line of gas-piping in the roof, found a more easy path to the earth by the gas mains than was provided for it in the drain.

In my experiments on the electrical condition of the terrestrial globe* I have already directed attention to the powerful influence which lines of metal, extended in contact with moist ground, exercise in promoting the discharge of electric currents of comparatively low tension into the earth's substance, and also that the amount of the discharge from an electro-motor into the earth increases conjointly with the tension of the current and the length of the conductor extended in contact with the earth. It is not, therefore, surprising that atmospheric electricity, of a tension sufficient to strike through a stratum of air several hundred yards thick should find an easier path to the earth by leaping from a lightning conductor through a few feet of air or stone to a great system of gas and water mains, extending in large towns for miles, than by the short line of metal extended in the ground which forms the usual termination of a lightning conductor.

It deserves to be noticed that in the cases of lightning discharge which I have cited, the lightning conductors acted efficiently in protecting the buildings from damage of a mechanical nature—the trifling injury to the church tower at Kersal Moor being particularly attributable to the proximity of the gas-pipe in proximity to the conductor. Nor would there have been any danger from fire by the ignition of the gas if all the pipes used in the interior of the buildings had been made of iron or brass instead of lead; for all the cases of the ignition of gas by lightning which have been under my observation have been brought about by the fusion of lead pipes in the line of discharge. The substitution of brass and iron, wherever lead is used in the construction of gas apparatus, would, however, be attended with great inconvenience and expense, and, moreover, would not avert other dangers incident to the disruptive discharge from the conductor to the gas and water pipes within a building. I have therefore recommended that in all cases where lightning conductors are attached to buildings, fitted up with gas and water pipes, the lower extremity of the lightning conductor should be bound in good metallic contact with one or other of such pipes outside the building. By attending to this precaution the disruptive discharge between the lightning conductor and the gas and water pipes is prevented, and the fusible metal pipes in the interior of the building are placed out of the influence of the lightning discharge.

Objections have been raised by some corporations to the establishment of metallic connexion between lightning conductors and gas-mains, on the ground that damage might arise from ignition and explosion. These objections are most irrational, as gas will not ignite and explode unless mixed with atmospheric air, and the passage of lightning along continuous metallic conductors will not ignite gas even when mixed with air. Moreover, in every case of the ignition of gas by lightning, the discharge is actually transmitted along the mains, such objections notwithstanding. A grave responsibility therefore rests upon those who, after introducing a source of danger into a building, raise obstacles to the adoption of measures for adverting this danger.

A MODIFICATION OF THE AMMONIA-PROCESS OF WATER ANALYSIS.

By Professor WANKLYN.

[From the *Mechanics' Magazine*.]

Chemists who have read my paper describing some experiments on albumen and urea (vide *Journal of the Chemical Society*, 1867, page 594), will have observed that the determination of urea by that process is very inferior, both in accuracy and facility, to the determination of actual ammonia and of albumen. Further experiments and much practice have, indeed, rendered the determination of "free ammonia" and of "albuminoid ammonia" in waters a very easy task, capable of being executed in less than half an hour; whereas the estimation of urea is not accurate and takes at least half a day and a great deal of trouble.

Now, although water into which actual sewage has found its way, will disclose the fact by showing excess either of free ammonia or of albuminoid ammonia, and although the ability to estimate traces of urea may possibly not lead to the rejection of a single sample of water, which the hitherto published water-process would not have rejected, still I think it useful to describe a process by which urea may be measured with something like that degree of facility which has already been attained in the matter of "free" and "albuminoid ammonia."

The process consists in evaporating to dryness with a little caustic potash, and heating the residue for a short time to a temperature of 160° C. in an oil bath. By this means all urea may be rapidly and completely transformed into ammonia, which is distilled off and "Nesslerised" in the well known manner.

In applying the process to a sample of water, I recommend that, first of all, a water-analysis should be made in the usual manner as described in a book on the subject. Then a fresh portion of the sample of water should be taken for the urea-determination. This portion may be 500 c. c. or 100 c. c., or even less according to circumstances. It should be introduced into a small retort, placed in an oil bath, and fitted to a Liebig's condenser. The free ammonia is to be

* *Philosophical Magazine*, August, 1868.

boiled off and the water evaporated down as far as may be convenient, and then treated with 10 c. c. of strong solution of potash. The evaporation to dryness with the potash is very easily managed in the oil bath. After everything has ceased to distil over at 160° C., the oil bath may be removed so as to allow the retort to cool a little, then some 10 or 20 c. c. of pure water are introduced into the retort and the distillation to dryness repeated. In this manner all the nitrogen present as urea will pass into the form of ammonia.

The strength of the above-mentioned solution of caustic potash should be about 20 grammes in 100 cubic centimeters. Great care should be taken to have it absolutely free from all traces of ammonia; a little of it should even be tested by actual evaporation to dryness in the oil bath.

I have verified the process on diluted urine, and got perfectly concordant and satisfactory results, and, moreover, find the process very easy of execution. The employment of a spermaceti bath to heat the retort is much to be recommended.

It will be remembered by chemists that "albuminoid ammonia" is a constant proportion, but not the total ammonia, which an albuminous substance can be made to yield. Along with the ammonia due to the urea present in a specimen of water, there will be obtained the missing ammonia from the albuminous substance when the treatment with potash in the oil bath is resorted to. Of course, allowance must be made for this when the amount of urea is computed from the results of experiment.

I believe that, to this day, there are chemists who will not use the ammonia-process on account of its only furnishing a certain fraction, and not the whole nitrogen of albuminous substances in the form of ammonia. Possibly, the consideration that it is now practicable to get the total nitrogen by this modification of the ammonia-process may weigh with such persons.

An obvious step which will commend itself to some chemists, will be to apply the *permanganate treatment* to the dry residue after the action of potash in the oil bath. To this there is no objection.

As I have already hinted, I do not expect that the modified ammonia-process will condemn any sample of drinking water that the unmodified process would have spared. But, in analyses of sewage and effluent waters, I consider the modification to be of practical importance. An application of it to the examination of specimens of urine will be described in the next number of the *Medical Times and Gazette*, and I expect that, for urinary analysis, it will displace the nitrate of mercury now employed in the titration of urea.

In conclusion, it is right that a warning should be given against a still further modification of the water-process, against raising the temperature to a red heat at the end of the operation, in the hope of dispensing with the employment of permanganate to evolve albuminoid ammonia. Such a step would be a fatal one. It would lead the operator into the error of returning the nitrogen actually present in the form of nitrates, as if it existed in the form of organic matter. One of the most important characteristics of the water-analysis which chemists owe to the exertions of Chapman, Smith, and myself, is that it ran no risk of such a catastrophe. The rival method of Frankland and Armstrong, on the other hand, runs extreme risk of this kind, and when applied to water containing nitrates (as, for example, the London water), is admirably fitted for the production of sensational reports.

THE SEWAGE QUESTION.

The last of a series of 33 articles on the sewage question appears in a recent number of the *Medical Press and Circular*. The conclusions of the writer are thus expressed:—"We have now reached the end of our inquiries into the sewage question, and on reviewing the facts which have been brought to light we perceive the startling truth that, however valuable the constituents of sewage may be in theory, we have done our best to render them worthless, or nearly so, in practice; for, through the instrumentality of our self-made sanitary authorities, we have so dealt with the subject as to have not merely destroyed the agricultural value of a product which in all time has been regarded as a rich fertilizer of the ground, but have actually brought it into such a dangerous state of decomposition as to be an almost ungovernable nuisance. In the right order of nature there can be no doubt that the proper destination of the excretions of all animals is the soil, where they find the means of becoming elaborated for the plant, which finally returns them to us as food. But this order of things has been perverted by the creation of difficulties which our utmost ingenuity is unable to cope with. We strive, it is true, to restore in our own fashion the waste products of animal life to the mineral and vegetable worlds for which they are destined, and to which they will return at last in spite of our meddlesome interference, but we have so altered the natural and proper condition of things as not only to hinder but actually to embarrass the common operations of nature. We have drowned, for example, the materials intended for the food of the plant in water that ought to flow unpolluted into the river, and then we wonder that the filthy mixture defies our skill, and can neither be utilized nor purified by the action of land or water. In some cases, where large agricultural results have been achieved, as on the Craigentinny meadows at Edinburgh, all sanitary considerations are abandoned, and the sewage is allowed to flow upon the ground in such enormous quantities as to convert the locality into a stinking morass which is a public nuisance; besides which the effluent water is so foul as not to be admissible into any decent watercourse, and therefore runs directly into the sea. On the other hand, when sanitary results are aimed at, as when the sewage is sprinkled upon the land by means of hose and jet, in the water-pot fashion, as was the case at Tiptree Hall, at Rugby, at the Earl of Essex's, and at the Voujours Farm, near Paris, the agricultural results were so unprofitable that notwithstanding the ardour and strong faith of its advocates, it was at last summarily abandoned. So that whether we wish to realize commercial profit or sanitary success we are alike in a difficulty as to the right means of dealing with the subject. Attempts have been made, as we have seen in the course of our inquiries, to balance the difficulties by working in a sort of intermediate manner between the extremes of 300 tons per acre of land per annum and 10,000 tons; but, as might have been expected from such a compromise, the results have been neither profitable nor successful, for they have combined the difficulties and realized the disadvantages of both extremes. It is abundantly evident, indeed, from the facts before us, that sewage irrigation can never be successfully practised except under peculiar circumstances, as where the land is far removed from human habitations, where the soil is so porous as to admit of free and almost unlimited percolation, where the effluent water can be discharged at once into the sea, where the sewage can reach the land without the aid of steam power and of long and expensive carriers, and where the produce of the land—the rank sewage grass—will find a ready sale for dairy purposes.

"On the other hand, the disadvantages of sewage irrigation, as it is now practised, are so numerous and so formidable as actually to appal us; for in the first place it often happens that the sewer outfall is so much below the level of the land that costly motive power and expensive conduits are required for the transport of the sewage. Secondly, the necessary quantity of land (an acre for every 25 persons) is not always to be obtained at a reasonable price within a reasonable distance; for the land must be porous, with a moderately level surface, a proper outfall, and not liable to subsoil pollution. Thirdly, in all cases the ground must be levelled, and thoroughly drained, and otherwise prepared for the reception of the sewage. Fourthly, there is the difficulty of disposing of sewage in wet weather, when the quantity is larger than usual, and when the ground is already loaded with moisture. Fifthly, there is the pressing and imperative necessity for continually, systematically, and thoroughly defæcating the sewage, so as to produce at all times an effluent water which can be freely admitted into the neighbouring watercourses without danger of polluting them. Sixthly, there is the serious disadvantage of the non-applicability of sewage to any other crop than grass, which can only be profitably used for dairy purpose. Seventhly, the noisome character of the operations and the filthy sodden state of the soil are undoubtedly dangerous to the public health, for a damp atmosphere reeking with sewage effluvium is known to be a prolific source of typhoid and enteric maladies. Eighthly, the subsoil water, if not properly diverted, is apt to reach the neighbouring wells, and render then unwholesome. Ninthly, there is the great probability of producing entozoic infection of both man and animals by the distribution of excremental ova upon the land and its produce. And, lastly, there is the admitted uncertainty of every practical question connected with the subject, so that it is impossible to say whether the soil should be light or porous; whether it should be drained or not; whether the sewage should pass through the land or merely over it; whether the distribution should be by open carriers, or by loose subsoil pipes, or by means of the hose and jet; whether the dressing should be large or small; whether it should be applied in summer or winter; whether the crop should be grass, or roots, or cereals; whether the grass should be eaten green, or dried by artificial heat into hay; and whether the produce is best suited for making flesh or producing milk; in point of fact, there is not a single question relating to the subject which the so-called practical men are able to answer in a definitive or satisfactory manner.

"All these considerations lead to the conclusion that the present method of distributing sewage upon the land is eminently unsatisfactory, for it is wasteful, it is inefficacious, it is expensive, and it is dangerous. The right way of dealing with the subject is first to defæcate the sewage by means of one or other of the best precipitating processes, and then to use the clarified water upon the land if it be thought desirable, and if not, to discharge it into a neighbouring watercourse. In this manner the defæcation may be so conducted as to suit the special requirements of the case; for if the effluent water is to be employed for irrigation purposes, there is no need of such a careful and perfect disinfection of the sewage as when the water is to be at once discharged into a neighbouring stream. By this means all desirable results may be secured; for not only may the necessary disinfection be so accomplished that the effluent water may be either used upon the land when the season permits, or discharged into an outfall channel, but the precipitated matter may be so treated as to destroy the vitality of parasitic ova, and form the basis or compost of a merchantable manure. We thus secure the most important sanitary requirements, and the most hopeful prospect of agricultural success.

"It is unfortunate that some of the Parliamentary Committees and Royal Commissions that have been created for the express purpose of dealing with this important question have approached the inquiry with a manifest bias in favour of some particular scheme, and with a preconceived opinion of the way in which the subject should be treated. They have, therefore, selected their witnesses and sifted the evidence so as to suit the particular objects in view. It is still further to be regretted that some of these commissions have been so formed as not to include a single sanitary authority of medical education and experience. What value, therefore, can be attached to the conclusions and recommendations derived from such a source? In one notable instance, where the evidence was flagrantly dealt with in an inquiry before a committee of the House of Commons, and where, to use the words of Mr. Ker Seymour, who brought it under the notice of the House, the chairman of the committee (Dr. Brady) 'passed by one whole class of evidence, and gave prominence to the evidence of persons who agreed with him,' the evidence was, by order of the House of Commons, cancelled. Next to a reprimand at the bar of the House, this was the most severe censure that could be passed on a member of Parliament; and it is to be deplored that the same kind of partisanship is exhibited in more recent inquiries. We pass by the cost to the public of these unsatisfactory investigations, although, perhaps, it may not be out of place to quote the remarks of Lord Elcho in the House of Commons, on the 7th of April last year. 'We doubt,' he said, 'the advantage of spending so many more thousands of pounds upon this commission (the Royal Rivers Pollution Commission), because, looking at the knowledge already acquired, we do not think that its sittings will be worth their cost to the country. Besides upwards of £3000 a year for salaries, £800 are charged for travelling expenses, and £700 a year for the laboratory; and the expenses of reporting and printing are enormous.' It would be interesting to the public if Parliament were to inquire whether the laboratory and its appointments are used for private as well as public professional purposes, and whether, if such be the case, it is in accordance with the rules of the House or the conditions of the appointment.

"Here, then, we leave the subject, and, in so doing, we put a final question—Whether the present system of removing excremental matters from our houses by the agency of water has not created more waste, and greater sanitary danger, and more expensive litigation than any other system which the ingenuity of man could have devised? not forgetting that the water which is thus wastefully and irreparably fouled amounts to from 20 to 30 gallons per head of the population daily, and has been brought at great cost from the purest sources, and perhaps filtered in the most careful manner. What other nation would have been guilty of such folly?"

DR. WHITMORE'S REPORT ON THE QUALITY OF THE GAS SUPPLIED IN ST. MARYLEBONE, IN JANUARY, 1872:—

JANUARY, 1872.	Illuminating Power in Sperm Candles.			Mean Pressure in Tenths of an Inch.		Mean Quantity of Sulphur in 100 Cub. Ft.	Mean Quantity of Ammonia in 100 Cub. Ft.	Sulphuretted Hydrogen.
	*Mean of 240 Obser.	Highest.	Lowest.	Highest.	Lowest.	Grains.	Grains.	
Imperial Company's gas . . .	17·35	17·40	16·10	26·70	10·06	33·12	0·25	None.
Chartered Company's common gas . . .	16·54	17·36	13·86	32·43	10·21	32·13	0·33	None.
Chartered Company's cannel gas	23·17	25·80	22·50	28·77	15·03	26·76	0·58	None.

Mean of daily readings of barometer . . . . . 29·47
" " " thermometer . . . . 56·71

* Each observation consists of 10 readings of the photometer, at intervals of one minute.

The illuminating power of the Imperial Company's gas ranged very high during the month, it showed a mean equal to 17¼ candles, and never fell lower than 16 1-10th candles, the mean quantity of sulphur found in 100 cubic feet of this gas amounted to 33 grains, whilst the ammonia amounted to only a quarter of a grain. The Chartered common gas gave a mean illuminating power equal to 16½ candles, and ranged between 17·36 and 15·86 candles, the amount of its sulphur impurity was rather more that 32 grains, and of ammonia rather over the third of a grain. The cannel gas gave a mean light equal to rather more than 23 candles, it ranged between 23·80 and 22·50 candles, the amount of its sulphur impurity was 27 grains, and of ammonia half a grain. The pressure of all the gases was uniformly satisfactory, and on no occasion did the ordinary tests detect in either of them a trace of sulphuretted hydrogen. The above results were obtained from the gas manufactured by the Imperial Company, at their Fulham Works, and from the Chartered Company's gas manufactured at their works, Horseferry Road, Westminster.

DR. WHITMORE'S REPORT ON THE QUALITY OF THE WATER SUPPLIED IN ST. MARYLEBONE, IN JANUARY, 1872:—

JANUARY, 1872.	Total Solid Matter in degrees or grains per Imperial gallon.		* Loss by Incineration of Solid Matter in previous column.		Ammonia.
	Jan., 1871.	Jan., 1872.	Jan., 1871.	Jan., 1872.	
Distilled Water . . .	0°	0°	0°	0°	0°
† West Middlesex water .	19·86	19·44	0·98	0·98	—
Grand Junction water. .	19·78	20·04	1·04	0·98	—

* The loss by incineration represents the amount of organic and other volatile matters contained in an Imperial gallon (70,000 grains) of water.

† In my last monthly report on the quality of the water of the West Middlesex Company, a very palpable error on the part of the printer as to the amount of its organic impurity occurred. It there appears that the loss by incineration of the solid matter amounted to 10·4 grains; the decimal point should have been placed one more figure to the left, which would have made it 1·04 grains.

DUMFRIES GAS-WORKS.—Steps are being taken for the transfer of the Dumfries Gas-Works to the police commissioners.

REDUCTION IN THE PRICE OF GAS AT TUNBRIDGE WELLS.—From the commencement of the present quarter the Tunbridge Wells Gas Company have decided to reduce the price of gas to 4s. 6d. per cubic foot.

WATER SUPPLY OF FAVERSHAM.—At the annual meeting of the water company, held on the 12th inst., the directors report stated that 631 houses are now supplied with water, 48 having been added during the year. The total balance in hand amounted to £387 12s. 2d., out of which the directors recommended that a dividend of 4½ per cent. be paid to the original shareholders.

BOUGHTON BLEAN GAS COMPANY.—The annual meeting of the shareholders was held on Tuesday, Feb. 13—Mr. W. Broadbridge in the chair. The profits on the year's operations, terminating Dec. 31, 1871, amounted to £79 3s. 7d., out of which the directors, in their report, proposed to declare a dividend on the paid-up capital of £5 per cent., free of income-tax, and to carry the balance to next year's profit and loss account. The directors also proposed to reduce the price of gas from 7s. 6d. to 7s. per 1000 feet.

PURCHASE OF THE HUDDERSFIELD GAS-WORKS.—At the monthly meeting of the Town Council on the 21st inst. a resolution was adopted to the effect that the deed of transfer of the Huddersfield Gas-Works, &c., be approved, and that the sum of £140,400 be paid out of the borough fund in respect of such purchase. Mortgages to the amount of £51,540 on borough fund account, and to the extent of £69,288 being conversions from the Huddersfield gas shares were effected, and a committee, to be called the Gas Committee, was appointed.

WATER-WORKS AND CANAL COMPANIES.—In the Court of Chancery, on Wednesday, Feb. 14, Vice-Chancellor Malins, after hearing elaborate arguments on both sides, made an important order affecting the right of water-works companies to divert water from springs flowing into canals. The Wilts and Berks Canal Navigation Company had filed a bill against the Swindon Water-Works, and declined to answer interrogatories, and his honour held that the water-works company had a right to the surplus water from certain springs, and ruled that the interrogatories be answered.

REDUCTION IN THE PRICE OF GAS AT SHANKLIN, ISLE OF WIGHT.—Expressions of dissatisfaction at the price charged by the Shanklin Gas Company per 1000 feet of gas have been frequently made, and although all admitted that the gas was manufactured under considerable difficulties and at great expense, the general feeling was that 7s. 6d. per 1000 cubic feet of gas was by far too high a figure. At a recent meeting of the shareholders this matter was carefully considered, and a report of the directors, recommending that a reduction be made of 10d. per 1000 cubic feet, was unanimously adopted.

WATER SUPPLY OF RICHMOND (YORKS.).—At the quarterly meeting of the Town Council held on Thursday, Feb. 8, in reference to the revision of the water-rate, it was resolved that it be an instruction to the Water-Works Committee to ascertain the price of water per 1000 feet charged in other towns, and that in the revision of the water-rate any ratepayer, being dissatisfied with the price charged to him, be entitled to use a meter, and pay upon the quantity thereby consumed, he providing the meter; and that the committee be requested to report on such revision to the next meeting.

SUPPLY OF GAS AT MODBURY.—On Monday, Feb. 6, the annual meeting of the gas company was held. The report stated that the total expenditure amounted to £162 12s. 9½d., and the income to £286 6s. 11d., leaving a balance on the year's profits of £123 14s. 1½d., which, together with the balance of the previous year, after a dividend of 5 per cent. had been deducted therefrom, amounted to £203, available for dividend and a reserve on the past year. The dividend on this sum it was proposed should be £5 per cent., and after this was paid, it was found that a balance of £128 10s. remained as reserve-fund.

ARBROATH GAS COMMISSION.—The Committee of Management of the Arbroath Gas Corporation held their quarterly meeting on the 15th inst., when, amongst other matters under consideration, there were applications from the fireman at the works, and from other labourers, for an advance of wages and a reduction of hours—the former from 3½d., as at present, to 4d. per hour, and the latter from 60 to 57 hours per week. The committee were unanimously of opinion that no alteration at present could be made, inasmuch as the matter was fully gone into not six months ago, when considerable advances were given, and the cause for the complaints about the then existing arrangements removed.

WILLENHALL GAS COMPANY.—The half-yearly meeting of this company was held on Wednesday, Feb. 7, at the office of Messrs. Rutter and Neve, solicitors, Wolverhampton. Mr. H. H. Hewlings, the chairman of the company, presided, and among the other shareholders present were—Messrs. R. D. Gough, James Tildesley, Joseph Walker, T. Pitt Jones, W. H. Weaver, W. Partridge, B. Savage, &c. The statement of accounts was presented and passed, and the usual dividend of 10 per cent. declared on the ordinary shares. Mr. Proud, of Birmingham, was appointed engineer to the company, and Mr. Clement Tildesley was appointed secretary, in the room of Mr. John Greader, deceased. The vacancy on the board of directors, caused by the retirement of Mr. Henry Hill, was filled up by the election of Mr. James Tildesley.

AN EXPENSIVE SPREE.—At the Accrington Police Court on the 17th inst., Robert Cartmell, who did not appear, was summoned for compensation for neglect of work. Mr. Barrett, manager to the Accrington Gas and Water Works Company, said the defendant was an assistant purifier. He came to work at eight o'clock on the 5th inst., and left about an hour afterwards. He did not return until five o'clock at night, and he was then very drunk. He asked him to go home and get sober, and he then became very abusive and swore. He had returned to his work, and was now in the employment of the company. £1 1s. was reasonable compensation for the loss they had sustained. They had suffered so much from that sort of thing that they had lately posted up a notice warning the men. The defendant was sent for, and having promised not to offend again, was ordered to pay £1 1s.

LONGTON GAS COMPANY.—The report of the directors of this company to be presented to the shareholders at their meeting on the 26th states that the profits for the half year are £1702 15s. 7d., which amount added to the unappropriated balance of £151 18s. 3d. from the last half year, makes an amount of £1854 13s. 10d. available for dividend. Out of this sum the directors recommend a dividend to be declared at the rate of 10 per cent. per annum on the original, and 7 per cent. per annum on the ordinary 7 per cent. shares, and that the arrears of dividend, at the rate of 4 per cent. per annum, be paid for the half year ending the 30th of June, 1867, all free of income-tax, and that the balance remaining of £199 3s. 4d. be carried forward to the next half year's account. The directors report the steady progress of the company's business during the half year, and state that the works and plant of the company have been maintained in a state of efficiency.

EXPLOSION AT THE GREAT NORTHERN RAILWAY.—An explosion took place at the terminus of the Great Northern Railway late on Friday night, Feb. 16, which happily was not attended with such serious consequences as was at first anticipated. It appears that it is the habit of the gas engineers to fill the portable gasholders, which are placed in the trains, at a work-room situated between York Road and the King's Cross Station. Two men, named Thomas Mather and Walter Shirley, were carrying down on their shoulders to the main platform of the station a gasholder which they had just filled. The usual tests were applied, and it was found to be quite tight. They had not proceeded far when it exploded, throwing both men down and burning them very much about the head, shoulders, and arms. They were speedily conveyed to the Royal Free Hospital, where it was found that although both men were much shaken, their injuries were not of such a nature as to cause alarm.

WAKEFIELD GASLIGHT COMPANY.—The fifteenth ordinary half-yearly meeting of the proprietors of this company was held on the 19th inst; Mr. W. Statter, chairman of the company, presiding. In moving the adoption of the accounts, the chairman stated that the early closing of shops and the ceasing to work at the mills an hour earlier than usual had affected the receipts to the extent of £300 or £400 a year. There was an actual increase in the receipts for gas of £100. The expenditure during the half year amounted to £4651 9s. 3d. The credit account showed the total receipts to be £8260 12s. 8d., leaving a balance of profit on the half year's working of £3599 3s. 5d. The accounts were passed unanimously, and the usual dividend declared of 10 per cent. on the old shares and 7½ per cent. on the new, which will absorb £3076 8s. 10d., leaving a surplus of £522 19s. 7d. It was further stated that the new gasholder, which, with all the necessary appliances, has cost nearly £11,000, was ready for use.

MELTON MOWBRAY GAS COMPANY.—The half-yearly meeting of shareholders and directors was held on Friday, Feb. 9, presided over by the chairman of the board of directors, N. Whitchurch, Esq. Up to this time no printed report has been laid before the half-yearly meeting of shareholders, and the chairman, as heretofore, gave an oral statement of the position and prospects of the company. During the year ending Dec. 31 about £1000 has been expended in permanent works; the larger proportion of this sum has already been paid out of revenue. Within a period of three years about £3000 has been laid out, which has enabled the company to meet the increased and necessary demand for gas. The value of the property and plant has therefore increased in appropriate ratio. The price to consumers is now 5s. per 1000 feet, and although this is a reduction of over 20 per cent. the income of the quarter ending Jan. 1, 1872, is nearly £100 in advance of the corresponding quarter of 1871. A dividend of 15s. per share was adopted.

GEORGETOWN, BRITISH GUIANA, GAS COMPANY, LIMITED.—On Thursday, Feb. 15, 1872, a meeting of the shareholders was held at the offices of the company, Westminster Chambers, London, Henry P. Stephenson, Esq., in the chair. The following report of the directors was received and adopted—"Your directors have to report that the whole of the first issue of 6000 shares have been placed, and that a considerable portion have been paid up in full. Tenders have been taken for the ironwork required in the works, and for the pipes, meters, and services, and the lowest tenders have been accepted, and the work is in progress. Arrangements have been made for taking possession of the company's land and property in Georgetown. The directors are about to appoint a manager to proceed to the colony, when the erection of the necessary brickwork and buildings will be commenced. The directors propose to hold the general meetings hereafter half yearly." The whole of the directors retired from office, and were unanimously re-elected. A vote of thanks to the chairman was passed, which terminated the proceedings.

WATER SUPPLY OF MARGATE.—At the meeting of the Town Council, on the 7th of February, a letter was read from the secretary of the water-works company, which stated that the shareholders of the company, at a special meeting, had decided not to accept the offer made by the council for the purchase of the water-works. There was also a memorial signed by Dr. Head and other residents on the Cliftonville estate, complaining of the action of the council in opposing the provisional order of the company, and pointing out the importance of a better supply of water for the locality in which the memorialists resided. A long debate ensued, and ultimately the matter was referred to the special committee appointed some time since on the water-works question. There appeared to be a determination on the part of the council not to offer any additional sum, and it was stated that the opposition was taken up to protect the ratepayers, who it was believed in the event of the proposals of the company, when carried out, not proving successful, would be called upon to make up any deficiency by increased rating.

RISE IN THE PRICE OF GAS AT SWANSEA.—At the meeting of the Local Board of Health on the 22nd inst., Alderman Jenkins drew the attention of the board to the fact that the gas company had given notice of their intention to raise the price of gas 3d. per 1000 cubic feet after the 1st of April, and moved a reference to the committee to report as to the best means to prevent the gas company from carrying out their intention. Mr. Jenkins said the price of gas was much higher in Swansea than in several other towns, notwithstanding coal was on the spot, and consequently cheap. He instanced, among other cities and towns, Bath, where the illuminating power was two candles higher than at Swansea, and the price only 2s. 9d. per 1000 cubic feet as against 3s. 6d. in Swansea. He hoped the committee would wait upon the gas company, and if the directors persisted in their determination he thought the corporation should seriously consider whether they should not put into operation the powers which the Act gave them, and erect gas-works themselves, and he had no hesitation in stating that for 3s. per 1000 a very good profit could be obtained. Several other members spoke to the same effect, and the resolution was carried.

FYLDE WATER-WORKS COMPANY.—At the half-yearly general meeting of this company held on the 15th, the report showed that the payments on capital account during the half year ending December 31st, 1871, amount to £1023 18s. 6d. (principally on account of the new main to Poulton), making a total to this date of £91,059 1s. 8d. Towards the cost incurred in the repairs of the Grizedale Reservoir, £3664 0s. 9d. has already been appropriated from revenue account, leaving a sum of £495 10s. 8d. still to provide. The amount received for water in the six months was £3655 7s. 7d.; less interest on loans and commission, £342 4s. 7d.; do. working expenses, £890 18s. 11d.—£1233 3s. 6d.; leaving a net balance of £2422 4s. 1d. The directors recommended a dividend to be declared after the rate of five per cent. per annum on the original subscribed capital £60,000, also on the new issue of £15,000, free of income-tax. This would absorb £1873 1s., leaving a balance of £549 3s. 1d., out of which it was proposed to carry the sum of £495 10s. 8d. to the credit of the Grizedale Repair Fund, thus closing that account; and the balance, £53 12s. 5d., to be carried forward to next account. The total cost of repairs to the embankment of the Grizedale Reservoir amounted to £4158 11s. 5d., and has now been entirely defrayed from revenue account. The number of houses now supplied with water is 3707, being an increase of 114 during the past half year.

HULL WATER-WORKS COMMITTEE.—On Monday, February 12, a meeting of this committee was held at the Town-Hall, Alderman Chapman in the chair. The clerk reported that it had been found that a large of persons were using water for baths and horses without paying for it. They had been summoned to attend at his office to have the rate adjusted. The engineer remarked that the rent which the persons alluded to would have to pay, would amount to about £192 per annum, and as only a third of the town had as yet been inspected, a large increase of revenue might be expected. The wages of the engine drivers and firemen were increased from 1s. to 5s. per week, according to the *status* of the men. The treasurer reported that he had borrowed £2000, at 4½ per cent., for five years, free from all deductions, on account of new works at Spring Head. The engineer's usual fortnightly tabulated statement showed that the total quantity of water sent into the town during the fortnight was 66,271,693 gallons; the largest quantity on any one day, on the 27th ult., 5,209,028 gallons, the smallest on the 31st ult., 4 668,503 gallons; increase, 525,458 gallons; available yield every 24 hours, 10,000,000 gallons.

THE DUNDEE WATER SCHEME.—A conference was held on Friday, Feb. 9, between the Dundee Water Commission and Mr. Leslie, C.E., the result of which was that Mr. Leslie accepted the responsibility of recommending the plan for a new water supply to the town, now before Parliament, as having been prepared to a great extent under his own personal direction, and the best scheme yet submitted. He asserts that the greatest pressure on his direct route will be only 490 feet, and that it is less than on Mr. Bateman's; that a pipe to bring 5,000,000 gallons daily from Lintrathen, in addition to the 2,500,000 from Monikie, would be sufficient for a number of years to come; and it would be extravagant to add 8,000,000 at once to the present supply; that the economy of putting down a smaller pipe now would pay for a larger pipe hereafter; that 50 gallons per head daily—the Glasgow rate of supply—is unnecessarily large; and that to treble the present supply would be ample. He gave the length of pipes on his direct route as 17 miles, and held that if there is to be a clear water basin it must be at Lintrathen; the loch might be divided so that a part of it would be the clearing basin.

CARLEON GAS COMPANY.—The half-yearly meeting of this company was held on the 13th inst. The report stated that the revenue account showed a balance of £57 14s. available for dividend, and the directors recommended the payment of a dividend on the 1st of March next, at the rate of 4 per cent. per annum. The directors, acting upon the unanimous expression of opinion of the shareholders at the last general meeting, in favour of converting the £250 loan into share capital, recommended the loan to be capitalized and the suspense account to be closed, bringing forward the amount of redemption fund charged to the half year ending the 30th of June—viz., £1 13s. 4d., and placing the same to the credit of the half year ending the 31st of December. The directors had been enabled to carry out their arrangements for a reduction of the cost of management consequent upon the completion of the manager's house and office, and the result of the change would be realized in the next half-yearly account. The manager stated that the make of gas at the works during the past half year was 757,700 feet, and that the waste was at the rate of 18 per cent., which was considered a very small per centage.

THE METROPOLIS WATER ACT.—On Wednesday last the new Metropolis Water Act, providing for a constant supply, came into operation, and on and after that date it is the duty of the water companies to see that every house is properly provided with fittings, and to enforce the conditions which will be sanctioned by the Secretary of State. The penalties for defective fittings are decisive, for not only is the defaulter liable to a fine of £5, but the companies have power to cease the supply of water, and to report him to the nuisance authorities. If the provisions of the Act are not complied with as regards fittings, misuse of water, and undue consumption of it, the company supplying the water, without prejudice to any remedy against the defaulter, may cut off the service and cease to supply water so long as the injury remains, or is not remedied; and in every case of so cutting off or ceasing to supply, the company shall within twenty-four hours thereafter give to the nuisance authority, as defined by the Sanitary Act, 1866, notice thereof; and if the fittings are not repaired within the prescribed time, the house shall be a nuisance within the meaning of the 11th section and sections 12 and 19 inclusive of the Nuisances Removal Act, 1855, and shall be deemed as unfit for human habitation.

GAS SUPPLY OF FORFAR.—The monthly meeting of the Gas Corporation was held on Wednesday, Feb. 7.—Provost Whyte in the chair. The committee minutes were read and approved of. The minutes stated that plans of additions and alterations to the works had been submitted, and explanations thereon given by the manager. The committee had agreed to remit the plans to the corporation. Reports on the proposed additions and alterations, enabling the corporation to manufacture double the present quantity of gas, were read and considered. According to the convener, Mr. Lowson, there is a large increase in the consumption, while the profits for the first year would probably be about £300. He, however, recommended caution in dealing with the additions and improvements. The provost corroborated what the convener had said, and advised the corporation to remit the plans to the committee, with instructions to recommend what additions and alterations were absolutely necessary at present, and what could be left over till next season, and also to consider and report on the acquisition of additional ground as proposed in his report. After a few remarks by Mr. Laird and others, it was agreed to adopt the provost's suggestion.

WATER SUPPLY OF DALKEITH.—The parliamentary trustees of Dalkeith, who are making arrangements to bring in a new supply of water to the town from Crichton, have received from Dr. Frankland, of London, the following report of the analysis of the water in that district:—"No. 1. The sample drawn from Spring Head is colourless and palatable, and is altogether a water of excellent quality for drinking. It contains a very small proportion of organic matter (organic carbon and organic nitrogen), and, being spring water, the moderate amount of evidence of previous animal contamination which it exhibits may be safely disregarded. For washing, the water is harder than is desirable. It has about the same hardness as the water supplied to London. It admits, however, of being easily softened down to one-half of its present hardness by the application of Dr. Clark's simple and inexpensive progress. The hardness would thus be reduced to 10·9° (7·6° on Dr. Clark's scale), and it would then be a moderately soft water, well adapted for washing. Sample No. 2, which is the same water after passing in a covered drain through a turnip field, differs from the previous sample in containing a much larger proportion of organic matter. I would therefore recommend that the water for the supply of Dalkeith should be taken from the Spring Head, and not from the foot of the turnip field."

LIVERPOOL UNITED GASLIGHT COMPANY.—The half-yearly general meeting of this proprietary was held on Tuesday, Feb. 20, at the temporary offices, Cornwallis Street. Mr. Thomas Earle presided. From the report read by the secretary, Mr. P. H. Garnett, it appeared that the directors, upon an estimate of the profits for the half year ending December last, recommend a dividend for the half year of £5 on every £100 stock, and £3 10s. for every £100 on the capital paid up in respect of the 7 per cent. shares. Since the last meeting, the company had sustained a severe loss in the death of their late chairman, Mr. Brancker. The vacancy in the board caused by his decease had been filled by the appointment of Mr. J. A. Tinne upon the directorship, thus rendering vacant the office of an auditor, which the proprietors were now invited to supply. The chairman moved the adoption of the report, including the declaration and payment of dividend. He also referred to the loss they had sustained in the death of Mr. Brancker, who was most assiduous in his attendance at the board. The resolution for the adoption of the report was seconded by Mr. J. Campbell, and confirmed. Mr. David Bateson was appointed auditor in place of Mr. J. A. Tinne. In reply to a question by Mr. Andrews, the chairman stated that the new buildings were nearly completed, and he hoped that before the next meeting they would be in occupation. A vote of thanks to the chairman terminated the proceedings.

MAIDSTONE WATER-WORKS COMPANY.—The report of the directors presented at the half-yearly meeting held on Wednesday, February 21, stated that the amount of water-rents for last year were £3140, the number of customers at that date being about 2350. It was proposed that a sum of £200 of the surplus revenue be applied to the reserve-fund. The well and boring referred to in the three last years reports are still in progress. The last report, in February, 1871, stated that in consequence of the lowest pipe in the borehole having by some means got out of the perpendicular, it was impossible to continue the boring to a lower depth without taking up the pipes already in the borehole, and that under the advice of the company's engineer, Mr. Edward Easton, the directors were then about to take the necessary steps to enable them to test the then supply of water to the well, in the hope that there might be a sufficient supply from the present well and boring to prevent the necessity and consequent expense of continuing the boring to a greater depth, and that the directors had ordered the pumping apparatus which they had been advised by their engineer was proper for the purpose. The directors asked the meeting for power to raise £1000, being the last portion of the £10,000 preference capital authorized to be raised by the last Act, and also a sum by way of mortgage. It was recommended that a dividend on the ordinary share capital at the rate of 4 per cent., free of income-tax, be declared for the year 1871, which after reserving the £200 above-mentioned, would leave a balance of £952 4s. 5d. to be carried forward.

THE TRANSFER OF THE BOLTON GAS-WORKS TO THE CORPORATION.—At the quarterly meeting of the Town Council of the borough on Wednesday, Feb. 14, the mayor (Mr. Cannon) in the chair, it was reported that a meeting of the parliamentary committee was held on the 22nd ult., when the following letter was read from Messrs. J. K. Watkins and Son, solicitors to the Bolton Gas Company:—"Bolton, 16th January, 1872.—Dear Sir,—On the other side we send you copy resolution passed by a shareholders meeting of the Bolton Gas Company yesterday.—Yours truly, J. K. WATKINS AND SON.—R. G. Hinnell, Esq., town-clerk, Bolton."—(Copy resolution.)—"That the terms submitted to this meeting for the sale and transfer of the undertaking of this company to the Bolton Corporation, be and the same are hereby sanctioned and approved, and that the directors be authorized and empowered to take all necessary measures for effectually carrying out the same, and for settling all details thereof by a draft agreement, to be passed under the common seal of the company and the corporation, and by proper clauses to be inserted in the Bolton Corporation Bill in Parliament, for obtaining the sanction of Parliament to and effectuating the same agreement." It was resolved that the mayor, the chairman (councillor Walmsley) and councillors Rushton, P. C. Marsden, and Winder be appointed a sub-committee to confer with the parliamentary committee of the directors of the gas company upon and settle the draft agreement to be prepared for the transfer of the company's works to the corporation.

PERTH GAS COMMISSION.—A special meeting of the Gas Commission was held on Monday, Feb. 12—the Lord Provost presiding. It was announced that the committee had raised the wages of the men employed at the gas-works, and that the rise came to £132 12s. a year. Mr. Wotherspoon thought the matter should have been brought up at the commission before being settled. The Lord Provost said that if the powers of committees were to be limited they might at times lose valuable men. Bailie Greig observed that it was dangerous to carry out anything without the consent of the commission, as had been done in this case, and gave notice that at next meeting he would move that the findings of any committee be not acted upon without the sanction of the commission. Bailie Jamieson explained that the commission had invested the committee with full powers. Mr. Moir complained that no time was allowed for the examination of plans of alterations on new works, and on the motion of the Lord Provost it was agreed that the plans of alterations at the works and a new coal store at the harbour should lie on the table for eight days, to give the commissioners time to examine them. Mr. Thomas, the clerk, was authorized to enter appearance on behalf of the commission, in opposition to an interdict at the instance of Mr. W. Briggs, Arbroath, against the commissioners purchasing secondary products. It was agreed to pay £1767 for the gas-works stores, as valued by Mr. Laidlaw, of Glasgow. At a meeting held on the 19th it was resolved that No. 1 plan of alterations at the gas-works be adopted, and it was remitted to the committee, with full powers to carry out the alterations, also that the plan for the new coal-stores at the harbour be decayed at present.

EDINBURGH WATER SUPPLY.—The water return to the 20th inst. shows that at that date Glencorse reservoir (which has been for some time under repair) was 24 feet 9½ inches down, containing 16,000,000 cubic feet of water. In the corresponding week of last year it was 7 feet 1 inch down, containing 40,065,167 cubic feet. At 6th inst. it was 15 feet 8½ inches down, containing 26,646,000 cubic feet; so that there has been a decrease during the fortnight of 10,646,000 cubic feet. Loganlea, Clubbiedean, and Torduff have remained full during the fortnight, containing respectively 19,572,400 cubic feet, 9,889,290 cubic feet, and 18,255,571 cubic feet. At the corresponding date last year, Loganlea was 31 feet 1 inch down, containing 2,600,000 cubic feet; Clubbiedean was full; and Torduff was 12 feet 6 inches down, containing 11,840,000 cubic feet. Bonally, at 20th inst., was 5 feet 10 inches down, containing 4,000,000 cubic feet; at 6th inst. it was 6 feet 0½ inch down, containing 3,900,000 cubic feet; so that there has been an increase during the fortnight of 100,000 cubic feet. At the corresponding date last year it was 14 feet 11 inches down, containing 950,000 cubic feet. The total quantity of water in stock at 20th inst. was 67,717,262 cubic feet, as compared with 65,344,457 cubic feet at the corresponding date last year. At the 6th inst. the stock was 78,263,265 cubic feet; so that there has been a decrease during the fortnight of 10,546,000 cubic feet. The delivery in Edinburgh at the 20th inst. was, as it had been at the 6th inst., 938·96 cubic feet per minute, being equal to 33·27 gallons per head per day to a population of 254,000. At the corresponding date last year the delivery was 753·76 cubic feet per minute.

ROCHESTER AND CHATHAM WATER-WORKS COMPANY.—At the half-yearly meeting of the shareholders held on Tuesday, Feb. 20., the report presented by the directors showed that during the past six months there has been a scarcity of water in the wells, from which many of the houses in the various localities of the company's district are still supplied, and in many other instances where the water in the wells has been sufficient the quality has been proved to be bad and injurious to health. These causes have had the effect of inducing a considerable number of persons to take their supply of water from the company, but as it is chiefly cottage property, the advantage to the company is not so great as the increase in the number of customers would make it appear. The present well engine pumps not being equal to keep up the increasing supply of water required to be raised, the directors have felt it necessary to make arrangements to replace them by two new double-action pumps. These pumps will be made to raise double the quantity of water to that raised by the present ones, and the directors hope to have the new pumps fixed and at work before the hot dry weather sets in, so as to be prepared to meet the increasing requirements of the towns and Government establishments. The directors recommended that a dividend at the rate of £6 per cent. per annum (free from income-tax) be declared upon all shares for the half year ended 31st of December, 1871. The statement of accounts showed that £46,539 had been received on capital account, the whole of which had been expended. The revenue account showed

that £4063 had been received from water-rates during the past half year, leaving, after the payment of all working expenses, and the payment of a further sum of £800 on account of law, preliminary, and engineering charges, a sum of £1402 available for dividend, a sum of £513 being carried forward to the next half year's account.

WATER SUPPLY OF KILMARNOCK.—The committee of the town council appointed by the council on the 3rd of January "to examine into the condition of the water-works and value thereof, with reference to the proposed purchase under the agreement in Act of Parliament," have reported that they applied to the water company for leave to examine their works, books, and accounts, but this the company declined, and they had not been able, in consequence, to give the subject that thorough investigation which they might otherwise have done. The conclusion arrived at, from the information within their reach, was adverse to the proposed purchase. The consequence of the council taking over the water-works would be the imposition of the maximum rates, domestic and public; and the risk and responsibility of raising large sums of money in loan, and of renewing from time to time these loans, would be laid on the corporation, who, with such a small margin, might fail in raising the funds, and thus have to meet the statutory penalty. Taking all the circumstances into account, and considering that the present water company were bound, under statutory obligations which could be enforced in court after July, 1873, to provide the community with a full and plentiful supply of water at all times and at the present maximum rate of 1s. per pound, the committee were disposed to advise the council not to complete the water-works purchase on the terms provisionally arranged, but in the meantime to "let well alone."

SOUTH STAFFORDSHIRE WATER-WORKS COMPANY.—The following is the report of the directors:—"Your directors have to report that the increase in the company's revenue from water-rates during the past half year has been satisfactory, and there is every indication of a growing demand throughout the district. The number of houses supplied is now 23,848, being 395 more than in the previous half year. After paying interest on loans and preference shares, the balance remaining is £2923 2s. 3d.; and your directors recommend the declaration of a dividend on the ordinary share capital at the rate of £4 per cent. per annum, free of income-tax; the dividend warrants to be issued on Monday, April 1, 1872. The new works at Wood Green, although not entirely completed, are in operation, and the supply of water to the high-lying districts is now given with greater regularity, simultaneously with the lower. An additional pumping-engine is in course of erection at Lichfield, which will enable your directors to meet the increasing demand, and will tend to prevent interruptions to the supply through accidents to machinery. Your directors deem it prudent to make provision for the payments for these new works, and for the ordinary extensions of mains required from time to time. Accordingly, at an extraordinary meeting, to be held immediately after the ordinary meeting this day, a resolution will be submitted to the shareholders, empowering the directors to issue 1000 new £10 preference shares, to bear 5 per cent. interest, in accordance with the provisions of the Acts of Parliament relating to the company. The following members of the board retire from office by rotation, but are eligible, and offer themselves, for re-election—viz., Sampson Lloyd, Esq., Henry Rotton, Esq., and John Nurthall Brown, Esq.

HORSFORTH AND THE LOCAL GOVERNMENT ACT.—The difficulty between the inspectors under the Gas Lighting Act and the overseers of Horsforth again came before the West Riding magistrates, at Leeds, on Tuesday, Feb. 13, in the shape of an application by Mr. W. Emsley, who represented the inspectors. Mr. Emsley showed that an order had been served upon the overseers by the inspectors, requiring them to levy and collect the sum of £150 for the purpose of meeting expenses incurred or about to be incurred under the Act. He stated that there had been in Horsforth a great amount of meddlesome feeling with regard to the public officers, but he apprehended that in considering the application the magistrates would have nothing to do with that. Having quoted the 37th section, which has reference to the action the magistrates may take in such cases, he asked that a warrant should be issued for levying the amount, and mentioned that £100 had already been spent. The overseers admitted that the order had been served upon them, and said they were willing to lay a rate and sign it that very day, if arrangements could be made to have the summons suspended. Mr. Mayhall (whose advocate, Mr. Malcolm, had intimated that he had no *locus standi*, because he merely represented ratepayers) objected to the application on the ground that the election of inspectors had been irregular, there having been no notice to the ratepayers. He also represented that the lighting Act was a most inefficient measure, and stated that an effort is being made to get the Local Government Act introduced. The magistrates declined to take the objection into consideration. Mr. Emsley, who had objected to Mr. Mayhall being heard, said he was quite content that the summons should be suspended, if the overseers levied the rate. If Mr. Mayhall or any one else objected to the rate, then they must proceed in a legal way. The magistrates suspended the summons for four weeks.

PERNICIOUS INFLUENCE OF COAL-TAR COLOURS UPON THE HUMAN SYSTEM.—The coal-tar colours, now such important articles of commerce, are under certain circumstances capable of exerting injurious effects upon the human constitution, to which public attention ought to be drawn. Aniline itself is an acknowledged poison, and all colours containing it in an unchanged state are poisonous also. The general symptoms of aniline-poisoning are a changed colour of the skin, deep violet colour of the lips, an accelerated pulse, shivering of the whole body, trembling of the hands and feet, anxiety and difficulty of respiration. Many of the oxidizing agents used in the preparation of the aniline colours are also poisonous, such as the arsenic acid, clorides of zinc and tin, compounds of antimony and lead, &c. The true cause of poisoning in these cases is not, therefore, the colour itself but the impurities present, and the acids, hydrochloric, arsenious and picric, with which it may be combined. The latter, in particular, is found in many of the more modern colours, such as the aniline-greens and the orange preparations. The low qualities of colours, especially aniline-crimson prepared from residues and loaded with impurities, are most to be dreaded. Such colours, from their low price, are used in staining paper-hangings, wooden toys, flutes, matches, cheap confectionery, and bonbons, such as are sold at fairs, india-rubber articles, &c. From many of these the colour is easily removed. Woollen and mixed tissues dyed with the coal-tar products are now very largely used, owing to the brilliance and comparative cheapness of the colour. Needlewomen and others who have to work much with these materials often suffer from the effects of the arsenic and picric acids. The fingers are inflamed, showing small pimples upon a red ground; the face also is similarly affected. Equally injurious are the phenyl colours prepared from phenylic or carbolic acid, traces of which remain uneliminated. Rosolic acid, coralline (peonine), and azuline are rarely found in the market free from these impurities. Their use is thus liable to give rise to diseases whose origin and nature are not easily recognized.—*Mechanics Magazine.*

INCREASE IN THE PRICE OF GAS AT CRADLEY HEATH.—A large meeting of gas consumers of Cradley Heath, Cradley, and Old Hill, was held on Thursday, Feb. 8, to consider the proposed advance of 3d. per 1000 feet made by the Cradley Heath Gas Company. Mr. Nock presided. In opening the meeting the chairman said that the question they had met to consider was of great importance to gas consumers of the above districts. The notice issued by the company was as follows:—"In consequence of the great increase in the price of coal, lime, and wages, the gas consumers are respectfully informed that the price of gas will be advanced, from the 14th day of February next, 3d. per 1000 feet. This additional charge will be taken off when the coal, &c., is reduced in price." That notice aroused the indignation of the consumers, as the gas company, some 18 months ago, promised not to raise the price of gas above 3s. 9d. per 1000 feet. Mr. Homer said that he thought the gas company had taken an unfair advantage of the consumers, and said they ought not to submit to the advance made. Mr. Green said that some 15 months ago the price of gas was agreed to be 3s. 9d. per 1000, and did not remember that it was arranged that the gas company should not raise the price. Mr. Homer said at the time mentioned by Mr. Green they (the consumers) received a reduction from 4s. 6d. to 3s. 9d. per 1000. Mr. Green said he thought it was not an act of generosity, after capitalizing a profit of £7000, at 4 per cent. interest. On the motion of Mr. Green, seconded by Mr Burgess, the following resolution was carried:—"That, considering that the consumers have felt for so short a time the benefit of the reduced price of gas, and the extraordinary profit which the gas company previously made, and which by arrangement has been admitted by the company in their Act of Parliament, and also as no other gas company in the district has advanced the price, we feel that in the future, if no other company follow their example, and the price of gas to us is not reduced, we must take such steps as will prevent any advance in the price of gas." Mr. Homer proposed that the chairman should write to the directors of the gas company, requesting them to postpone their decision to rise the price of gas for the present. The directors of the gas company subsequently intimated to the consumers that they could not adopt the suggestion to postpone the proposed advance of 3d. per 1000. The increased rate commenced on Feb. 14.

NEWPORT (MONS.) GAS COMPANY.—The half-yearly meeting was held on the 19th inst.—Mr. Gratrix in the chair. The report stated that the result of the half year's account enabled the directors to recommend the payment from net revenue of dividends at the rate of 5 per cent. on class A shares, and 3¾ per cent. on class B shares. The alterations and improvements reported in August last as necessary to one of the gasholders were completed, and it worked satisfactorily without the aid of chains and weights. Gasholder No. 2 had been repaired, and considerably strengthened, the cost of which would be charged to future revenue. During the forthcoming summer it would be necessary to make extensions—this would necessitate an addition to the capital account. The call would be only of such an amount as would be deemed necessary to meet the outlay under that head. The strikes among the colliers had caused the directors much anxiety. They were, however, enabled to report a renewal of the coal contract on favourable terms. Mr. E. F. Marfleet (from the Cambridge Gas Company) had been appointed secretary to the company, in the place of Mr. Marshall. The engineer reported the works to be in a satisfactory state. The revenue account for the half year showed that there was a balance brought on of £1711 17s. 10d.; the receipts had amounted to £5886 12s. 8d., making together £7598 10s. 6d. The expenditure, including dividends paid, had been £5759 1s. 3d., leaving £1839 9s. 3d. to be carried forward. On the motion of the chairman, seconded by Mr. Newman, the report and statement of accounts, as printed, were adopted. It was then resolved on the motion of the chairman, seconded by Mr. Christophers—"That dividends be declared at the rate of 5 per cent. on class A shares, and 3¾ per cent. on class B shares, such dividends to be payable on the 26th inst." The chairman brought before the meeting an application from the school committee of Newport, for aid in providing elementary education for the children of the town so as prevent the necessity for levying a rate for the purpose, which it was estimated would amount to 9d. in the pound. The directors thought if they were allowed to contribute a sum of £25 in the event of their being satisfied they should not have to pay a rate as well, a resolution would be placed before the meeting to that effect. The company is now rated at £1000 a-year, so that a 9d. rate would be £37 10s. After some conversation on the subject the chairman withdrew his proposition, objection being taken to it on the ground of want of notice, and that such an application of the funds of the company was *ultra vires*.

SHEFFIELD WATER-WORKS.—At the Town Hall, Sheffield, on Tuesday, the 13th of February, the adjourned summons, taken out by Mr. William Wright, plumber and builder, of 36, Carver Street, against the Sheffield Water-Works Company, for refusing to allow a water-pipe to be connected with the main from the complainant's two houses, situate in Ecclesall Road, called Waterfall Villas, again came on for hearing. Mr. Blackburn (instructed by Mr. Joseph Binney) appeared for the complainant, and Mr. Barker (instructed by Mr. Blakelock Smith) for the water company. Mr. Blackburn said the complaint made was that the company had refused to supply the defendant with water, and allow a pipe to be connected with the main. One circumstance which the bench would have to consider would be the construction of the Act and of the regulations as to whether or no a man has a right to have a cistern for more than one house, and whether or no the company have a right to refuse to supply a customer because one cistern should supply one or more houses. The complainant on being examined said he was the owner of some property situate on Ecclesall Road, called Waterfall Villas. When he commenced the building he made application to be supplied with water for building purposes, and it was agreed that he should have a meter. A pipe was laid down, and a ferrule put into the main to make the pipes communicate with those of the company. When the building was completed he made application for a permanent supply. He was given to understand that the company would not supply two houses with one pipe. He served the first notice on Mr. Waterfall, manager of the company, which was a notice of 14 days. Several notices were afterwards given. Mr. Barker contended that there was no pretence for saying that there was a dispute as to the mode in which this pipe should be connected with the main. The company were willing to make any communication in any way between Mr. Wright and themselves. He submitted that the summons had been wrongly framed. The magistrate said the bench were of opinion that this was a matter of dispute as to the manner in which the intended communication pipe should be made to communicate. Mr. Barker said there was no right for the inhabitants to demand a supply from the company; but from a separate communication from the company's mains. Mr. Blackburn, referring to the Act of Parliament, said it was contemplated that any owner should be entitled to have one pipe supplying several houses, he paying or tendering a rate. He had a *prima facie* right, after laying down a communication-pipe, to demand a supply of water from the company. The case was ultimately withdrawn.

BROMSGROVE GAS CONSUMERS COMPANY, LIMITED.—The annual general meeting of the shareholders of the above company was held at the Bromsgrove Town Hall, on Monday, Feb. 12—Mr. Jefferies, chairman of the board of directors, presiding. Some formal business having been transacted, the report of the directors was read by Mr. H. Brewster, secretary. It stated that the profits of the last year's trading had been £494 7s. 9d., out of which it was recommended that a dividend of 5 per cent. be declared, and a balance of £174 7s. 9d. be carried to the reserve-fund, making that fund £432 10s. 9d. The report also recommended the issue of 1000 additional shares of £1 each, to be offered in the first place to the present shareholders, in accordance with the Articles of Association, such increase being necessary on account of the capital originally raised not being sufficient to pay for the purchase of the business, plant, &c., from the old company, and the necessary extensions. The report further recommended that consumers of less than 5000 feet of gas per half year be charged for the use of their meters, and congratulated the shareholders on the satisfactory prospects of the company. On the proposition of the chairman, seconded by Mr. Bennett, the report was adopted, and a series of resolutions was afterwards passed to carry out the resolutions mentioned above. Messrs. Jefferies, Bennett, and Frances, the retiring directors, were unanimously re-elected; and a proposition to increase the number of directors was negatived. Mr. Gosling, Worcester, was re-elected auditor, and a unanimous vote of thanks was passed to the chairman and board of directors for their continued attention to the interests of the company during the past year.

THE SEWAGE OF CAMBRIDGE.—On the 31st ult., a meeting of the University Syndicate was held at the Council room of the University, for the purpose of having an interview with Mr. Charles Bateman, who had been called in under the sanction of the Senate to advise them upon the various schemes which have from time to time been submitted by Messrs. R. R. Rowe, Bazalgette, G. W. Stephenson, and J. Bailey Denton respectively, for the diversion of the sewage of the town from the river. The town surveyor (Mr. Stephenson) attended the meeting, by request, having received instructions under an order of the board of commissioners to afford every assistance to the gentlemen whom the University authorities might consult, in making the necessary investigations. For this purpose, the whole of the previous designs, schemes, sections, and other drawings were placed at Mr. Bateman's disposal. On the following day, Mr. Bateman (accompanied by Mr. B. T. Moore, of Pembroke College, and the town surveyor) went over the town for the purpose of examining the existing sewers, and surveying the colleges, in order to ascertain if it were possible to utilize the existing sewers as a portion of a scheme to be submitted for consideration. After Mr. Bateman had minutely inquired into the various details, he made a survey of the different sites in the locality that had been previously inspected and reported upon as suitable for sewage irrigation; and his opinion, we understand, coincides with those previously given by the other engineers, that the Chesterton and Milton neighbourhood is pre-eminently favourable.

THE SEWAGE OF BIRMINGHAM.—Dr. Frankland has just forwarded to the Birmingham Sewage Committee a report upon their proposed method of treating the sewage of the town. In this document he says:—"As regards the principle involved in the scheme, I entirely agree with Mr. Hope, that, having regard to all the circumstances of the case, it is not desirable that the Corporation of Birmingham should become sewage-farmers on the enormous scale which would be necessary in order to utilize, to the best advantage, the waste overflow from their borough. It will, in my opinion, be more consonant with the duties of a public body to undertake only the efficient cleansing of the foul liquid, with the least possible cost and speculative risk to the ratepayers of the borough, and to attempt only the utilization of the sewage so far as it is likely to contribute to the attainment of these objects. Of the various methods for the purification of sewage which have been proposed and tested there are only two which have proved themselves successful in accomplishing their object. These are irrigation and intermittent filtration. Of these, the first, although in many respects the most desirable, is incompatible with the principle which you have laid down as your guide. The cleansing of the sewage of Birmingham by irrigation would necessitate the purchase of not less than 3500 acres of land, at a price which would render an adequate return for the capital invested extremely doubtful. The Corporation of Birmingham would not therefore be justified in applying the money of the ratepayers to such a purpose, when an alternative method of cleansing the sewage with far less outlay and quite as effectively presents itself. It was demonstrated in the laboratory of the Rivers Commission that intermittent filtration, carried out with due regard to volume of sewage per cubic yard of soil and to sufficient aeration of the material of the filter, is competent to cleanse very foul sewage, even when the latter is largely mixed with manufacturing refuse; and that most soils, if sufficiently porous, are effective filtering media. The Sewage Inquiry Committee have therefore, in my opinion, adopted that alternative method of dealing with the sewage which, whilst it is thoroughly effective, will entail but a small fraction of the cost for land and works that would have to be incurred in the establishment of an irrigation farm, and will, moreover, yield some return in mitigation of the expenses of management. It is my firm conviction that, with 500 acres of land at Lea Marston, you would be able to deal effectually with the sewage of Birmingham during the next 50 years. With the larger area, however, which you propose to take, there will be this advantage, that, beyond deposition in the tanks at Saltley, it will be entirely unnecessary to prepare the sewage, by precipitation with lime or other chemicals, before it runs upon the intermittent filters. This will save some expense, and probably a good deal of nuisance." On Friday, Feb. 16, a meeting of ratepayers was held at the Town Hall, "To authorize an application to Parliament in the present session for an Act for extending the powers vested in the Corporation of Birmingham, as the sewer authority for the borough, for making further provision for the improvement of the sanitary condition of the borough, and for other purposes." The mayor (Alderman Sadler) presided. The town clerk stated the object of the bill which the corporation proposed to apply to Parliament for. The scheme of the sewage committee, which the town council has approved, briefly, is to do away with the open-midden system, and intercept fæcal matters, so as to dispose of them without letting them enter the sewers; to discourage the use of water-closets by subjecting each one to an annual rate not exceeding 10s.; and to purify the sewage of the town by filtering it through land, which the council is to be empowered to acquire. Alderman Avery moved a resolution authorizing the application to Parliament for the necessary powers, and also for powers to raise and borrow for the purpose of the said intended Act, or for other purposes of the corporation as the sewer authority, any moneys not exceeding the sum of £400,000. The motion was seconded by Alderman Hawkes, and carried with three dissentients.

SANITARY CONDITION OF BASINGSTOKE.—Dr. Ballard, one of the medical inspectors of the Local Government Board, has recently conducted an investigation into the sanitary state of this borough. The ground of the inquiry was a memorial from 42 inhabitants of the town, representing that the sanitary condition of the town was very unsatisfactory, on account of various defects in drainage, the existence of open cesspools, and the pollution of the water, and that fever of a virulent type was prevalent. From Dr. Ballard's report we make a few extracts. He states that "the control of the drainage of the town is vested in the hands of a self-elected body of Paving and Lighting Commissioners, by a local Act of the date of 1814-15 (55 Geo. III., cap. 7). They long ago exhausted their original borrowing powers, and under them can only raise a very limited sum of money annually, by means of a rate. After paying interest on borrowed moneys, and the expenses of lighting the town, a very small amount is left for expenditure upon drainage works. Putting aside the outfall at the canal basin, the Loddon receives all the liquid sewage which does not find its way into the cesspools. In most of the streets, those not provided with the sewers referred to, the sewage may be seen running from the back premises, stable-yards, slaughter-houses, &c., either across or beneath the footway into the gutter at the side of the roadway, and all along this to one of the branches of the Loddon. It is said that in hot dry weather all these gutters and the stream of the Loddon, which is nothing but an open sewer, are very offensive. At the west end of Brook Street the stream formed a wide pool of sewage, close to some cottages newly erected. The bed of the river everywhere was much silted up with sewage deposit, and so also was the basin of the canal. This basin, together with the canal for some miles, is now a stagnant pool in consequence of the breaking-in of a tunnel some miles below, and is a source of much offence to persons residing in the neighbourhood. The gully gratings in the sewered streets are said to be trapped, but the trapping is not sufficient to prevent the exhalation of offensive sewer gases at certain times of the year, or during the prevalence of east winds. It is quite impossible, in speaking of the mode of disposing of the excrement of the population, to disconnect from it the subject of water supply, so closely are the two associated. In all parts of the town, on the hill-sides and in the valley alike, the soil is positively riddled with wells and cesspits. Each house has its well, or, where the houses are small, there may be a well for the supply of three or four houses. Each house also, or nearly every house, has its cesspit, or dead well, for the reception of excrement and slops, and these pits are sunk, in many instances, as deeply as they can be without arriving at water. Several instances were mentioned to me in which, at the upper part of the town, the cesspits were carried down quite to the water level, and some in which disused wells had been converted into cesspits. At the lower part of the town I myself saw cesspits which had recently been cleaned out in which the soil water was standing. There are in all parts of the town, wells actually surrounded by privy cesspools and dead wells at the distance of three or four yards. The soil in which these wells and cesspits are dug being either loose gravel or chalk fissured in all directions, the well water must of necessity be everywhere more or less contaminated by excremental soakage. In short, throughout the town people are unwittingly drinking their own excrement. This pollution of the wells in some places is so manifest that the use of the water for domestic purposes has had to be abandoned. Some of the inhabitants at the lower part of the town, finding the well water polluted, have had recourse to the water of the Loddon as preferable to it. But even at the upper part of the town the use of the well water has occasionally had to be given up on account of its unmistakeable pollution by cesspool soakage. The wells attached to the poorer houses are also insufficiently protected for surface contaminations. In many places the residences of the poor were unfit for human habitation—dark, dilapidated, low, and unventilated. Large open dung-pits are another of the institutions of Basingstoke. They abound everywhere, and many that I saw were heaped up with manure and refuse, evidently not having been emptied for a very long time. Stables, slaughter-houses, and cow-houses are alike unregulated. In one slaughter-house that I visited, although the paving was good and firm, the walls were very filthy, having been evidently without limewash for many a month. Bloody water was standing upon the irregular pebbled surface of the yard, the only means by which it could at any time run off being along the surface into the gutter of one of the principal streets. In many places I saw pigs filthily kept in the neighbourhood of inhabited houses. It may readily be anticipated that all these sanitary faults which have been enumerated—air polluted with foul cesspits, the emanation from dungheaps, badly trapped gullies, open drains in the streets, the foul streams of the Loddon, water polluted with sewage and excremental matters, and a general neglect of sanitary precautions as respects the dwellings and food of the lower classes of the population, would produce their customary effect upon the public health and death-rate. The registrar of the district has obligingly taken out for me the deaths which have been registered of persons residing in the borough of Basingstoke during the last ten years, and they amount to 1061. Assuming the mean population to have been about 5114, the average death-rate may be stated to have been 20·7, or thereabouts. This is much too high for an agricultural population. The assertion of the memorialists that fever has of late been rife in Basingstoke is correct. The organization for the protection of the public health in Basingstoke is a subject soon disposed of. When I say that in his town there are two local authorities, one of which does nothing, and the other next to nothing—except by spurts—that the Sanitary Act is to the nuisance authority as if it had never passed the Legislature, that there is but one inspector of nuisances for the entire union, extending three miles beyond the town, and that he is not only inspector of nuisances, but also fills the office of superintendent of police and inspector of weights and measures, I have said almost enough. The Paving and Lighting Commissioners do nothing to amend the drainage of the town, because they cannot raise the necessary funds for the purpose; and so every man drains his premises exactly as is most convenient to himself, without any regard to the health or convenience of his neighbours. The Town Council, which is the nuisance authority, and has an abundance of power to remove nuisances under the Nuisances Removal Acts, permits overflowing privies and dungheaps to poison the air, the contents of cesspools to soak into dwelling-houses and wells, and any butcher who pleases to slaughter diseased meat for human consumption. The truth appears to be that the town of Basingstoke is suffering from a complication of local authorities, and that sort of conflict of local interests which commonly arises under such circumstances. Sanitary matters there are at a dead lock, nor can any great improvement be anticipated until the sanitary administration of the town in all that relates to sewage and drainage, water supply, the removal of nuisances, and the prevention of disease, is concentrated in one public board. The report closes with several recommendations for amending the present state of things. At a meeting of the Corporation of Basingstoke, on the 13th inst., the report was read, and a long discussion took place thereon. Alderman White moved—"That steps be taken towards the adoption of the Local Government Act in the town." This was met by an amendment by Mr. Knight—"That the corporation do what they can to remedy the evils complained of by Dr. Ballard, and that the town-clerk be requested to send an answer to this effect to the Local Government Board, and that copies be sent to the Paving Commissioners, asking them to co-operate with the corporation." The amendment was put and carried.

Register of New Patents.

379.—HECTOR CLAUSE, of Rue de Bretagne, Paris, temporarily resident at Hatton Garden, in the co. of Middlesex, watch and clock manufacturer, for "*Improvements in taps or valves for gas, water, and other fluids.*" Provisional protection only obtained. Dated Feb. 15, 1871.

This invention consists in the employment of springs to the plugs of taps to keep them upon the seatings, and thus prevent leakage from wear. The springs may be at the bottom of the plugs, or at any other part.

395.—JOHN WILLIAM BEASLEY, of Greyhound Cottage, Lea Bridge Road, in the co. of Essex, for "*An improved ball-valve or tap.*" Provisional protection only obtained. Dated Feb. 16, 1871.

The principle of the slide-valve to all descriptions of taps, and for other purposes where the supply of liquids requires to be regulated, is the object of this invention.

426.—ALFRED WILLMER POCOCK, of Pimlico, in the co. of Middlesex, engineer, for "*Improvements in liquid-meters.*" Patent dated Feb. 17, 1871.

This relates to the employment of one or more eccentrically worked rings, cupped or otherwise on the main shaft, which cover or uncover ports as it or they rotate; also in a new construction of plug composed of two discs, and connected by a cross rib. A rim is carried about half way round the edge. There is a well in one disc, and also a passage leading to the ledge to allow the water to pass through it. The seating for the plug has four holes in it, which lead to the upper and lower parts of the cylinders. The two holes for each cylinder are exactly opposite each other to ensure the proper action of the pistons. There is a hole in the centre of the seating for the outflow.

443.—GEORGE EVELEIGH, of 16, Asylum Road, Peckham, in the co. of Surrey, consulting chemist, for "*Improvements in the manufacture and purification of gas and in certain parts of the apparatus employed therein.*" Patent dated Feb. 21, 1871.

This invention relates to the manufacture and purification of gas generated from coal, shale, bitumen, petroleum, turba, peat, wood, and in some cases water or other analogous substances, and refers in part to certain improvements in the means and apparatus for which letters patent were granted to the present patentee, dated the 7th day of January, 1869, No. 45.

The present improvements consist in distilling from one or more of the said substances in a suitable retort, at a comparatively low temperature of about 600° to 1000° Fahrenheit, the best and richest portions of the gas contained in such substances, together with the oleaginous, tarry, and other vaporizable matters, the residue remaining in the retort being coke of a superior quality. The rich gases, together with the said vaporizable matters, are conducted from the

said retort by suitable pipes in a manner somewhat similar to that ordinarily practised, but instead of the usual hydraulic main a large cooling-tank is by preference employed, wherein the chief portions of the oily and other vaporizable matters which come over with the gas are condensed as quickly as possible, allowing the rich gas to pass on into a peculiar cooler and condenser of the following character:—A large covered tank about half filled, more or less, with water receives the gas upon the surface of the said water from the pipe leading from the first-named cooling-tank, which may or may not dip slightly into the water therein; the gas coming in contact with the extended surface of water is still further freed from depositable substances, and when thus freed becomes lighter, rises to the top of the tank, and passes off at the opposite end by a pipe, the mouth of which rises nearly to the top of the tank; this gas may then be further cooled if needful by passing through pipes immersed in the water of the same or another tank, and from thence led to the usual lime or other purifiers. The larger proportion of the oleaginous and other vapours which is, as above stated, deposited or condensed in the first-mentioned cooling-tank, and the remainder which is deposited or condensed in the second cooling-tank and condenser, are then collected and conveyed into another tank from which they are caused to flow gradually into a heated pan, where they are revaporised at a suitable temperature, and from whence the vapours so reproduced are passed through one or more of the redistillation retorts charged with the chemical purifiers in the manner described in the specification of the patent of the 7th day of January, 1869. In the redistillation retort or retorts the said vapours are converted into gas, which is more or less purified therein as may be desired. From the redistillation retort or retorts the gas is passed through a cooling-tank similar to that first above mentioned containing water, wherein any of the oily or other vapours which have not been converted into gas by their passage through the redistillation retorts are again condensed, and may be returned to the revaporizing pan and redistillation retorts for further treatment, and so on again and again until the whole is decomposed or only pitch remains. From the cooling-tank this gas passes on to the condenser above described, mixing on its way, if desired, with the rich gases coming over direct from the first distilling retort, and passing on with them to the lime or other purifiers, and thence to the gasholder for use, or it may be kept distinct from the gases coming direct from the retort, and treated in a separate series of coolers, condensers, and purifiers, if needful, and passed direct to the gasholder. By this process the patentee states that he is enabled to employ a low temperature in order to obtain the best and richest portions of the gas from the coal, and by the treatment of the oily, tarry, and other gas producing vapours in the manner described, he fully utilizes them and obtains the remainder of the gas which they contain, and in most cases by these means he not only produces a larger total quantity of gas from a given quantity of coal, but the illuminating power and purity of the gas so produced are much greater than can be obtained by the ordinary process in which a great heat is employed. The value of the residual products, such as the coke and pitch, is also greatly increased.

In the drawings given with this number of the JOURNAL, which are exact reproductions of the drawings attached to the specification, fig. 1 represents a sectional elevation on line *a*, *a*, of fig. 2 of an apparatus which is found suitable for carrying out the said process of distilling rich gas at a low temperature from the coal or other substances, and the conversion into permanent gas of the oily, tarry, and other gas-producing vapours given off from the coal or other substances with the gas; fig. 2 represents a plan of the same partly in section.

Fig. 3, a half elevation and half vertical section of a bench of three retorts.

Fig. 4, a vertical section on line *b*, *b*, of fig. 1, through the redistillation retort.

And fig. 5, a vertical section on line *c*, *c*, of fig. 1, through the revaporising pan and its connexions.

A, A, are the retorts in which the coal or other substance is placed for distillation. These retorts are preferred to be of cast iron, they may be made about 8 feet long, 2 feet broad, and 1 foot 4inches high, of a D form as shown; such a size is adapted to receive a charge of about 4 cwts. of coal, if that be the substance employed. They may be set singly or in benches of any convenient number, and in the ordinary manner. The retorts are to be maintained at an equalized and uniform temperature of from about 600° to 1000° Fahrenheit, or it may be in some cases increased to 1300°, according to the kind of coal employed. The charge should be subjected to this heat for about 12 hours. A neck or pipe B, which is preferred to be of a conical form as shown, extends backwards from the end of the retort, and is the outlet for the gas and vapours; it is encased in brickwork so as to be shielded from the heat of the furnace flues. This is necessary, in order to prevent the said conical pipe from becoming red hot, as if the rich gas given off in the retort is made to pass through a red-hot pipe, decomposition takes place more or less, and a portion of the carbon contained in it is thrown down, and the illuminating power thereby reduced. The conical form of neck allows the gas to pass away from the retort with less friction than a narrow straight pipe. The outlet-pipes B, C, D, convey the gas and vapours downwards direct into the first cooling-tank E in order to prevent the oil vapours generated at the low temperature of the retort from becoming condensed in them, and running back into the retort, which they are found to do if made to rise therefrom in the manner usually practised with high temperatures. The said first cooling-tank E, which it is preferred to employ instead of the ordinary hydraulic main, receives the dip-pipes from the retorts below the water level F, and the outlet-pipe G is placed at the opposite side of the tank, so that the gas issuing from the dip-pipes D, D, D, has to traverse over a large surface of water before arriving at the outlet G, by this means it is quickly cooled, and the larger portion of the oily and tarry substances are condensed more quickly and certainly than they would be in the ordinary hydraulic main, and fall to the bottom of the tank, from whence they may be drawn off by the dip-pipe H and conveyed to the tar-well by the pipe to be treated as hereafter explained. The outlet-pipe G conducts the gas into the second cooler or condenser, which may be of the ordinary kind, or composed by preference of a large tank J, with an inverted bell or cover K, which dips into the water of the tank so as to seal the apparatus. The gas admitted by the inlet-pipe L (which may or may not dip into the water of the condenser) has to traverse over an extended surface of water before arriving at the pipe M leading to the coil N, N, by which the condensation is completed, and the gas is then passed on to the purifiers by the pipe O in the ordinary manner. The oily and tarry substances which fall to the bottom of the condenser are conveyed therefrom to the tar-well by the pipe P, similarly to those from the first cooling-tank. From the tar-well they are conveyed by pumping or otherwise into an elevated tank not shown, from which they are caused to flow in a regulated quantity through a syphon R into a revaporizing-pan S, kept at a temperature of about 500° to 700° Fahrenheit. In this pan the volatile constituents of the oils and tars are revaporized, and they may be passed direct into the redistillation retort T, which is similar to those described in the specification of the patent No. 45 (1869), before referred to. But in this case it is found the said redistillation retort should not be more than 3 or 4 feet long, or of only sufficient length to decompose the oil and other vapours, so that the rich gas may be conveyed away as soon as possible after being formed. It is preferred, however, to pass the said vapours by the pipe U into the intermediate chamber V, before allowing them to pass into the redistillation retort. The intermediate chamber V is heated to a temperature of about 700° to 900° Fahrenheit; it forms a trap in which any pitchy or mucilagenous substance may be deposited which might (in consequence of the application of too great a heat to the revaporizing pan) have been carried over with the vapours. Any such substances are conveyed back into the revaporizing pan S by means of the pipe W, arranged as shown, or in any other convenient manner. From the intermediate chamber the vapours are conveyed by pipe V_1 into the redistillation retort, which with its contents is heated by the furnace X to a temperature of about 900° to 1300° Fahrenheit, according to the speed with which the oil is admitted into the revaporizing pan, which together with the intermediate chamber may be heated by the waste heat from the furnace X somewhat in the manner shown—that is to say, the heated gases generated in the furnace X after acting on the charcoal cylinder T pass by the flues 1, 1, round and under the intermediate chamber V, heating it to the required temperature, thence they pass by flue 2 beneath the arch 3, 3, heating the cover of the revaporizing pan S. The heat reverberated downwards therefrom on to the surface of the oil evaporates it from the upper surface thereof, the air-flues 4, 4, 4, keeping the pan cool below, so as to prevent ebullition, which would cause the oil or tar to be carried over to the redistillation retort in a fluid state. If preferred the revaporizing pan and intermediate chamber may be heated by a separate furnace. The volatile vapours which pass from the revaporizing pan through the intermediate chamber pass on into the upper part of the redistillation retort and down through the heated charcoal, &c., being thereby decomposed and converted into permanent gas, which passes through the false bottom into the space beneath, and thence by the pipe Y to the cooling-tank E_1, which is similar in structure to that described in reference to the gas resulting from the redistillation of the coal. Any oil or tar vapours which may have passed along with the gas through the redistillation retort undecomposed are recondensed in this tank or the subsequent condenser, are carried off to the tar-well by the pipes H_1, I_1, and may be passed again and again through the revaporizing pan, intermediate chamber, and redistillation retort, so long as any gas-yielding substance remains in them; or they may be used as drying oils for paints, varnishes, &c. From the cooling-tank E_1, the oil gas may be conveyed by the pipe Z into the same condenser through which the coal gas is passed, and being mixed therewith, passes on to the purifiers along with it, or if it is desired to keep the gas resulting from the oily and other matters distinct from that resulting direct from the coal or other substances, a separate condenser and purifiers are employed. Any suitable number of redistillation retorts may receive the vapours produced in the revaporizing pan, or each redistillation retort may be arranged with a revaporizing pan and intermediate chamber, and each set so formed disposed side by side, as shown in dotted lines in fig. 2. By the use of the revaporizing pan the pitch, or the greater portion thereof, is deposited therein, and does not enter the redistillation retort, consequently the charcoal does not become blocked up with that substance, as sometimes happens when the oil is admitted directly into the redistillation retort. The pitch may be drawn off from the revaporizing pan from time to time by the pipe S_1 and deposited in the receptacle S_2. The revaporizing pan may also with advantage be used in connexion with the redistillation retort when producing gas therein from any fluid material, such as the vegetable or mineral oils, or from liquifiable gas-yielding solids, in order to prevent any pitchy, resinous, or mucilagenous matters present in them from entering the charcoal retort, and which matters are not required in or are prejudicial to the formation of good illuminating gas, and it is desirable to maintain its temperature, as before described, somewhat lower than that of the redistillation retort.

The patentee says he is aware that a low temperature has before been employed in order to obtain a gas of high illuminating power and purity, but the methods heretofore adopted have not been commercially successful, chiefly in consequence of the small quantity of gas that could be produced by such means.

By the means hereinbefore described, he states that he is enabled to produce an aggregate quantity of gas equal to and in some cases greater than can be obtained by the process now in use, in which high temperatures are employed, while the illuminating power and purity are considerably greater.

He is also aware that attempts have been made to produce gas from hydrocarbon oils and tar, but heretofore they have been subjected to destructive distillation after their formation at a high temperature, whereby very much of their valuable gas-yielding qualities have been sacrificed.

By the process herein described the hydrocarbon oils and tar are subjected to destructive distillation after they have been produced at a low temperature and condensed so as to retain as much as possible of the valuable qualities heretofore lost.

The claims are—

1. The production of rich gas together with the oily, tarry, and other gas-producing vapours by the primary distillation, the treatment of the said rich gas, and the oily, tarry, and other gas-producing vapours resulting from such primary distillation; and also the secondary distillation and treatment or conversion into permanent gas of the volatile constituents of such vapours, substantially as herein described.

2. The general arrangement and adaptation of the retort, cooling-tank, and condenser composing the apparatus for effecting the primary distillation and treatment of the rich gas and oily and other vapours, substantially as herein described and shown.

3. The revaporizing pan in connexion with the redistillation retort or retorts, substantially as and for the purposes described and shown.

4. The combination of the apparatus for effecting the primary distillation and treatment of the rich gas and oily and other vapours with that for effecting the secondary distillation and treatment or conversion into permanent gas of the volatile constituents of the oily and other vapours, substantially as described and shown.

452.—GEORGE HASELTINE, of Southampton Buildings, London, for "*An improved method of and apparatus for carburetting atmospheric air.*" A communication. Patent dated Feb. 21, 1871.

Uniformity of temperature in the hydrocarbon at the point required to produce the best result is preserved under varying conditions of the external air by the following devices. A revolving feeding wheel in combination with a box recipient is used, in which is employed water or other suitable liquid packing. The carburetter is enclosed in a vessel, and surrounded by water or sawdust or other packing. A receiver is provided, with two apertures, and surrounded by an outer vessel, and the latter is connected with the box by a pipe. The receiver and its adjuncts are combined with the devices for preserving uniformity of temperature by means of a pipe and elbow, and with an indicator provided with a gauge. The carburetter is divided into gas and hydrocarbon chambers, and the latter are enveloped by water-containing space in an outer vessel, with a thermo-syphon, in which there is a globe section. The carburetter is provided with the adjuncts herein specified in combination with a reservoir, and the hydrocarbon is automatically fed from the latter by pressure from the gas. A rod is arranged in combination with a float, to act on an index hand to show the depth of the hydrocarbon in the carburetter. In combination with a recipient, a tank, and the carburetter, and with or without an enveloping vessel, small pipes are used in which the air is heated by a burner. These parts are used in combination with the rod, and indicating appliances with this apparatus. The atmospheric air is carburetted by forcing a continuous current of air through the carburetter and the said current or currents are so regulated that the precise quantity of air needed, at the time, is carburetted.

461.—BENJAMIN SLATER, of Wellington Foundry, Charles Street, City Road, in the co. of Middlesex, ironfounder, for "*Improvements in apparatus for regulating the turning of gas, water, or other cocks, the opening and closing of ventilators, sky-lights, and other like objects.*" Patent dated Feb. 22, 1871.

This invention applies to regulators used for governing the supply of gas, water, or other fluids to buildings. It is also applicable to apparatus for opening and closing ventilators and sky-lights, and for purposes of a similar kind, such as opening and closing steam-valves, sluices, doors, gates, and other like objects.

A regulator of the kind referred to is usually constructed in the following manner:—A toothed wheel and pinion gearing together are enclosed in a case having a dial on its face. The spindle of the toothed wheel or of a wheel gearing with it or connected with it by gearing passes through the centre of the dial and has a hand or pointer fixed to it, and the toothed wheel has a groove in it with a band, cord, or wire passing round it, and fixed at one (or any) point in the circumference. This band, cord, or wire extends generally some distance to the gas, water, or other cock. The pinion is turned by a key or handle so as to turn the toothed wheel, and by means of the band, cord, or wire to turn on or shut off the gas, water, or other cock. The hand or pointer indicates on the dial the position of the cock. These regulators, though they are intended to put the regulation of the gas, water, or other supply under the control of one or more persons only at the place where the regulator is fixed, fail to do so, when the cords, bands, or wires or cock are exposed, for either the cords may be pulled or the cock may be turned independently of the regulator.

The object of this invention is to lock the regulators so that the cords cannot be moved nor the cock turned except by it. This is effected in the following manner:—In the case of the regulator above described a sliding bolt, projecting through the case, is fitted, having on it a stud, tooth (or teeth) which enters between two (or more) teeth of the wheel or pinion, and is kept in that position by a spring. When it is desired to turn the regulator the bolt is pressed so as to throw the stud, tooth (or teeth) out of gear with the wheel or pinion, and leave the regulator free to be turned. When after turning the key or handle the pressure is removed from the bolt the spring again throws the stud, tooth (or teeth) into gear, and locks the regulator. Sometimes, instead of having a separate sliding bolt as above described, the pinion is made to slide longitudinally, fitting it with a spring so as to press it forwards, and arranging in the case suitable fixed pins or studs which enter between its teeth when it is in that position. On inserting the key or handle the pinion is pressed backwards so as to clear it from these pins or studs and leave it free to be turned. On releasing the handle the spring pushes the pinion forwards again and engages its teeth with the fixed pins or studs so as to fix it in the position to which it had been turned.

The same or a similar construction can obviously be applied to regulators and other like apparatus for opening and closing ventilators and skylights and other like objects where movement is usually conveyed by cords, wires, or bands from an accessible spot to a distance, and for purposes of a similar kind.

469.—William Alfred Telling, gas-meter maker, of 49, Wellgate, and Samuel Johnson, draughtsman, of 18, Clifton Bank, both of Rotherham, in the co. of York, for "*Improvements in the construction of dry gas-meters.*" Patent dated Feb. 22, 1871.

This improved meter consists of a case divided into an upper and a lower compartment by a horizontal partition, the lower compartment containing a leather diaphragm and the flag wire and its attachments, the upper compartment containing a slide valve. A horizontal rocking shaft extends from the inlet to the outlet sides of the meter, having at the valve or inlet end a bent arm fixed to it directly over the centre of the valve cover. In the centre of the said rocking shaft is a weighted arm, and midway between this weighted arm and the end of the rocking shaft at the outlet end of the meter is a catch; in the upper compartment there is also an arm fixed to the top of the flag wire, having at its end furthest from the flag wire an adjusting arm with two moveable adjusting pins.

The operation is as follows:—When the gas enters the lower compartment, supposing the diaphragm to be at its full extent backward, and the gas to be admitted behind it, the diaphragm, by the pressure of the gas is urged forward, and its movement is transmitted to the upper compartment in the usual manner by a flag wire. It is evident that as the adjusting arm is fixed to the flag wire it moves simultaneously in the same direction as the diaphragm, and as the adjusting pins on the adjusting arm are so placed as to alternately come in contact with the weighted arm on the rocking shaft, the back adjusting pin on the adjusting arm in its forward movement coming in contact with the weighted arm (which is at a right angle with the rocking shaft) gives to it, the weighted arm, a forward and an upward movement, until, passing the centre of gravity, the weighted arm falls and at once reverses the valve by one end of the bent arm coming in contact with an upright pin on the cover of the valve, thereby admitting the gas upon the front of the diaphragm, and also by means of the catch before mentioned, which works into a toothed wheel of the index, recording upon the dial the quantity of gas passed and measured by the diaphragm. The weighted arm is prevented from falling too far by a stop attached to the rocking shaft.

472.—George Haseltine, of Southampton Buildings, London, for "*Improvements in apparatus for carburetting atmospheric air.*" A communication. Patent dated Feb. 22, 1871.

A wet jacket or the equivalent thereof is used in combination with the apparatus for the purpose of preserving uniformity of temperature in the hydrocarbon. The said apparatus has a revolving float composed of a perforated disc, a rectangular tube-like annular rim, and a stem. The perforated disc, provided with a rim and graduated stem, is employed in combination with a casing, and the latter is provided with a glass. Volute or spiral scroll metallic curtains are used for diffusing the air in connexion with duplicate curtains of fibrous materials in channels in combination with float. The fibrous curtains are held underneath the top of the float and apart from each other by means of metallic boldfasts. The stem of the float is made to terminate at a point above the hydrocarbon, to prevent the overflow of the same. Pipes provided with stop-cocks are used in connexion with the carburetter, to draw off the condensed water.

474.—Robert Heyworth, of the city of Manchester, plumber and sanitary engineer, for "*Improvements in apparatus for supplying water to wash-basins, and for flushing water-closets and urinals.*" Patent dated Feb. 23, 1871.

This invention has for its object the construction of an apparatus for supplying water to wash-basins and other similar receptacles, and for flushing water-closets and urinals without the possibility of waste of water taking place by ensuring only a certain quantity being drawn off each time the handle is actuated; and consists of a cistern or reservoir divided by preference into three compartments; one connected to a water supply by the ordinary ball-cock which supplies the necessary quantity of water to such compartment; the second compartment is arranged so that the water which enters it through a small hole from the first compartment may be caused to overflow or be lifted bodily into the third compartment which is in communication with the wash-basin or other similar receptacle, or with the water-closets or urinal. The overflowing or lifting of the water from the second to the third compartment being performed either by means of a block which may be caused to descend into the water contained in the second compartment, and thus to displace it, or by a piston being fitted in such compartment to lift the water, or by a scoop being mounted horizontally in such compartment and caused to tilt over when required by being connected to the actuating lever or handle.

475.—George Haseltine, of Southampton Buildings, London, for "*Improvements in gas-burners.*" A communication. Provisional protection only obtained. Patent dated Feb. 23, 1871.

The invention consists in a peculiar arrangement of two concentric rings of gas-jets, and presents several novel characteristics of construction, whereby is obtained a uniform and perfect diffusion of the gas; a perfect control over the gas issuing from the inner concentric ring of jets is also secured. Duplicate concentric rings of jets are combined with gas-chambers, and the latter are connected with a bifurcated section of a pipe, and respectively supplied with gas through suitable passages. I use a regulating key with the inner ring of jets in connexion with a passage, which above the key is divided into branch passages, and thereby regulate the flow of gas to the inner ring.

484.—William Morris the younger, of Kent Water-Works, Deptford, in the co. of Kent, engineer, for "*Improvements in apparatus for regulating and controlling the supply of water for domestic and other purposes.*" Patent dated Feb. 23, 1871.

This invention consists, firstly, in the use of a moveable seat in lieu of a fixed seat in the ball-taps employed in connexion with the waste-preventing service-boxes of water-closets and other purposes, in order to reduce the liability to injury of the seating of such ball-taps. Secondly, in the combination of a sliding discharge-pipe with a cylinder or water-box containing a moveable valve-seat resting on the discharge-pipe, so arranged as that on withdrawing the discharge-pipe from the valve-seat a given time will elapse before the seat, by its descent, will close the discharge-pipe again, thereby not only preventing continuous waste, but further ensuring the delivery of a regulated quantity of water. This is applicable to water-closets, stand-posts, and other like purposes.

489.—William Jackson, of the city of Norwich, in the co. of Norfolk, engineer, for "*Improvements in equilibrium pumps and turbines.*" Provisional protection only obtained. Dated Feb. 24, 1871.

The pump cylinder has a valve at the upper part, and the plunger is constructed of a hollow cylinder with two valves, one placed at the top of the suction-pipe which extends nearly to the top of the inside of the plunger, the other being placed in the centre of the plunger on the top of a pipe which extends nearly to the bottom of the plunger.

490.—John Lowthian, of 38, Lowther Street, Carlisle, in the co. of Cumberland, for "*Improvements in water-flushing apparatus.*" Patent dated Feb. 24, 1871.

A cistern or reservoir for the water is provided with a lever turning upon an axis of motion, and connected towards one end to one end of a chain or other suitable connecting means, the other end of which is connected to the valve of the flushing-pipe. To this end of the lever is also attached, by pin-joint with capability for adjustment, the upper end of a pendant rod, the lower end of which is hooked or formed to pass under the arm connecting the float or "ball" with the supply-tap, so that when the one end of the lever above referred to is drawn downwards, raising the other end of it, and lifting the valve to the flushing-pipe so as to allow of the water in the cistern passing away by the flushing-pipe for flushing purposes; then the hook of the pendant-rod comes under the arm from the supply-tap to the float, so as to prevent its descent, and the consequent opening of the supply from the main until the release of the lever above referred to, when the valve to the flushing-pipe will be closed, and, the hook to the pendant lever descending, the float will also descend to open the trap to the main for a fresh supply of water to the cistern. Stops regulate the distance of motion of the lever in either direction.

531.—Algernon Guthrie and James Stevenson, of Gravesend, in the co. of Kent, for "*Improvements in motive-power engines, pumps, and meters.*" Provisional protection only obtained. Dated Feb. 27, 1871.

This invention consists in constructing motive-power engines, pumps, and meters, by placing radially several cylinders, the outer end of each being closed, the inner ends open (open-top cylinders) between two circular discs, each disc being supported by a shaft working in suitable bearings. The one disc may work in contact with the admission ports or passages, the other against passages for the discharge or exhaust, so that as the passage or port of each cylinder alternately comes opposite, the steam, air, or water may flow or pass in or out, as the case may be. The piston-rods of the several pistons or buckets form vibrating connecting-rods, and are connected to or with a common crank-pin, and the effect, when the position or angle of the crank in relation to the cylinders is changed, is like that of a central moveable boss in a feathering paddle-wheel, and the steam can be admitted at various degrees of expansion, and the direction of rotation be changed by the movement of the crank in relation to the discs and the cylinders, or by the movement of the discs in relation to the crank-shaft and crank. When the apparatus is employed as a water-meter it is entirely enclosed.

535.—Joseph Truswell and William Truswell, both of Sheffield, in the co. of York, engineers, for "*An improved apparatus or means to be employed for heating air for warming rooms, apartments, buildings, or parts of same, and for other purposes of a similar nature.*" Patent dated Feb. 28, 1871.

This apparatus consists of any number of chambers (preferably pipes), which are fixed in one or more rows across a furnace, the ends resting on walls of fire-brick or other supports. The fire is placed beneath the end of the lowest row of pipes; each pipe or chamber is open at both ends, the air entering cold at one end, and, being heated as it passes through, is conducted to the place required to be warmed.

543.—Andrew Ainslie Common, of South Bank, Regent's Park, in the co. of Middlesex, engineer, for "*A new or improved automatic apparatus for opening and closing cocks, taps, or valves.*" Patent dated March 1, 1871.

This invention consists in an apparatus for opening and closing cocks, taps, or valves by the expansion of water in freezing and the subsequent thawing of the ice. The apparatus is composed of a closed vessel, only one part of which is elastic, and to this part is attached a rod in connexion with the cock, tap, valve, or valves. This vessel is filled with water and placed in a position where it is more exposed to cold than the valve upon which it is to act. While the temperature is above freezing point within the vessel the elastic part will remain in its position as fixed; but when the water within it freezes, and consequently expands, its pressure upon this elastic part causes it to move or bulge outwards, and thus give to the connecting-rod the proper amount of motion to secure the closing, or, as the case may be, the opening of the valve. When the temperature rises sufficiently to thaw the ice in the vessel the pressure within diminishes, and the elastic part of the vessel is forced inwards by the atmospheric pressure from without, and thus reverses the position of the valve.

556.—James Bannehr, of Great Queen Street, in the City of Westminster, and Henry Matthews, of Gower Street, in the co. of Middlesex, for "*Improvements in treating coal for the manufacture of gas and fuel therefrom.*" Patent dated March 2, 1871.

This invention has for its object the production of gas and fuel practically free from sulphur and sulphur compounds, and from other impurities.

Coal is reduced into particles sufficiently small to produce separation of the coal from the particles of mundic or iron pyrites and other heavy impurities which occur naturally in coal, and then, if the particles should not be of an uniform size, the particles of different sizes are separated from each other by sifting or by other means, after which the particles of coal are winnowed from the particles of mundic or pyrites or other heavy impurities by subjecting within enclosed channels the disintegrated matters to a current of air of sufficient force to carry the particles of coal beyond the points at which the particles of mundic and other heavy substances in consequence of their greater specific gravity will naturally fall. In some cases, in order to recover the whole of the finer particles of coal from the current of air before it escapes into the outer atmosphere, such current is caused to pass through one or more thin water-traps. Or instead of using water-traps for this purpose other suitable interceptors may be employed.

Coal treated as above described may be supplied to the gas-retorts either in the usual way or by mechanical means. Or in place of either of the above methods such coal may be mixed with an adhesive material, such as tar or any other gas-producing material or with any mucilaginous or gummy matter not

producing gas. When it is desired to make a moulded fuel from the coke resulting from the above process, it is treated in the manner described in the Specification of Letters Patent No. 456, Feb. 16, 1870, or other suitable means may be employed for this purpose.

672.—CHARLES FORSTER COTTERILL, of Cannock, in the co. of Stafford, gentleman, and GEORGE BIDDLE, of Cannock aforesaid, plumber, for "*Improvements in attaching taps or stop-cocks to water, gas, steam, and other pipes for making connexions therewith, and in apparatus to be employed for that purpose.*" Patent dated March 3, 1871.

This invention consists of a ready mode of attaching the taps or stop-cocks to water, gas, and other pipes, while they contain water, gas, or steam under pressure, without the loss or escape of water, gas, or steam, or without shutting off the water, gas, or steam from the pipes during the making of the connexion. This is effected by fixing an annular clip on the pipe or main, the said clip having a hole and collar screwed internally and screwing into the screw collar of the clip the inlet-pipe of the tap. The tap being closed, a drill is passed through the tap, and a stuffing-box on the drill screwed on to the exit-pipe of the tap. The drill being worked in the ordinary way, a hole is drilled in the pipe or main; the drill is then withdrawn sufficiently far to permit of the closing of the tap; the stuffing-box is next unscrewed and removed with the drill. The tap is thus left over the hole in the pipe or main, and in free communication therewith, the tap being fixed to the pipe by the collar of the clip. The end of the inlet-pipe of the tap may be made into a drill. In this case it is only necessary to rotate the closed tap to cause it to drill a hole in the pipe or main, a screw on the outside of the inlet-pipe of the tap screwing into the screw collar of the clip or into the hole drilled in the pipe or main. A clamp is used for working the drill, or combined tap and drill, consisting of a triangular frame, which is fixed to the pipe or main by curved cross-pieces at the bottom of its legs, and chains passed round the pipe and fastened to the said cross-pieces.

595.—ARNOLD BUDENBERG, of the firm of Schaffer and Budenberg, of Lower King Street, in the city of Manchester, in the co. of Lancaster, for "*Improvements in pumps.*" A communication. Provisional protection only obtained. Dated March 6, 1871.

In carrying out these improvements the valve-seats are formed to carry their valves in a slightly conical cylinder, which is received into a correspondingly formed chamber of the pump, and this cylinder is there held by a plate formed to embrace a part of the smaller end thereof, and by turning on inclined surfaces formed thereon, and against the end of the cylinder chamber, to draw the cylinder tightly in position. The larger end of the cylinder is formed with a handle, to facilitate its removal or the placing of it in position. Passages in the valve cylinder and its chamber communicate with the respective ends of the piston cylinder and the other ways. The chamber for the valve seats, with their valves, is at the lower part of the pump; the passages therefrom to the respective ends of the piston cylinder rise one on each side to the piston cylinder, which is at the upper part. The air chamber, when once it is employed, is formed between the valve chamber, the passages therefrom to the piston cylinder, and the piston cylinder; and the whole of these parts are by preference formed in one casting. The parts of the stuffing-box to the piston-rod and the connecting-joints to the inlet and outlet passages are formed with inclined surfaces for clips, so that, by turning them on these inclined parts, tightening of the joints is effected.

596.—JOHN HORTON, of 620, Broadway, New York, U.S.A., but at present residing at 113, Hagley Road, Edgbaston, in the co. of Warwick, manufacturer, for "*Improvements in gaseliers, sliding gas-pendants, and sliding gas-brackets.*" Provisional protection only obtained. Dated March 6, 1871.

These improvements in gaseliers consist in combining a central light, capable of being raised and lowered, with a series of two or more fixed lights. The central sliding light is carried by a gas supply-pipe sliding in the tubular body of the gaselier, and is supported by chains and a balance weight or weights. An ordinary water slide or a gas joint or packing is used to prevent the escape of gas. A gas joint or packing for this purpose is described, consisting of two concentric tubes secured in the tubular body of the gaselier, and two washers or packings fixed by screw caps or plugs in the larger tubes; the smaller tube is filled with bees-wax. The gas-pipe of the central light passes through, and slides in the chamber containing the bees-wax, and also through holes in the washer and screw-taps. This gas-joint or packing is applicable to sliding gas-pendants and sliding gas-brackets.

619.—WILLIAM GEORGE CANNON, of 52, New Kent Road, in the co. of Surrey, for "*An improvement in gas, steam, or water cocks.*" Patent dated March 8, 1871.

The novelty in this invention consists of a spindle passing through the bottom of the barrel and through the plug of the cock, keeping the plug in its proper bearing in the hand by means of a screw and washer at the top of the spindle, and held by a stop at the bottom, fitting between two ears at bottom of barrel, the plug having a tube through the centre soldered or brazed top and bottom to prevent the gas or other fluids escaping through the holes at top and bottom of the plug.

637.—JOHN CHAMPNEY BOTHAMS, of Salisbury, in the co. of Wilts, civil engineer, for "*Improvements in the construction of pipes for the conveyance of sewage or other fluids.*" Patent dated March 10, 1871.

This invention consists in adding to pipes in the lower part of the socket, and also on the outer side surface of the spigot end of the pipes, at equidistant points, two or more projections in equal size to about half the depth of the socket, so that, when the pipes are placed one in another, by causing one of the pipes to revolve on its axis in either direction until the projecting pieces on the spigot end of the pipe come firmly in contact with the pieces in the socket, the spigot end of the one pipe will become concentric with the socket of the pipe into which it is placed, and will be supported in that position; and the pipes will then be ready to be joined in the usual manner so as to prevent leakage.

646.—TIMOTHY MURPHY, of Clonmel, in the co. of Tipperary, Ireland, engineer, for "*Improvements in rotatory engines and pumps.*" Patent dated March 11, 1871.

This invention consists of a rotary engine or pump, composed of two concentric pistons, with an annular space between them, one cylinder carrying a projecting block or piston, and the other provided with stops or flaps to serve as obstructions for the steam or other medium to act upon, and steam being confined between the said stops and piston, so that both cylinders may be caused to revolve simultaneously in opposite directions, or either one of them held stationary during the rotation of the other. The sides of the piston are inclined to allow the stops to pass over freely, and the stops are forced inwards again after passing the piston by rods working through stuffing-boxes, and actuated by an external cam surface.

654.—GEORGE EKHOLME, of Rotherham, in the co. of York, engineer, for "*Improvements in water-closets.*" Patent dated March 11, 1871.

This invention consists in the use of a supplementary service box in water-closets, situate between the supply-cock and the basin, for the purpose of ensuring the delivery of a proper amount of water into the cistern after the cock has been shut, in order to properly trap the closet.

673.—ANDREW BARCLAY, of Kilmarnock, in the co. of Ayr, N.B., for "*Improvements in coking coal, and generating gas for heating and other purposes, and in the apparatus employed therefor.*" Provisional protection only obtained. Dated March 14, 1871.

This invention has for its object to effect economy in the coking of coal, and it consists in employing the gases driven off from the coal in the process of coking it, for the purpose of heating and maintaining the coking operations, the gas being either re-admitted to the coking-ovens or chambers through suitable channels, pipes, or passages in admixture with the quantity of atmospheric air necessary to ensure their combustion, so far as that can be practically attained, or caused to burn in flues surrounding the coking-oven in order to prevent the coal being coked from being consumed by contact with atmospheric air, care also being taken to reduce to a minimum the admission of air to the coking-ovens or chambers by other openings.

The gases may be drawn off and collected into a chamber or other receptacle, and forced back into the ovens or chambers by a jet or jets of air or steam, or by any exhausting and forcing mechanism, such, for example, as an air-pump or fan.

The gas obtained in this manner may be conducted through pipes and used for heating puddling, scrap, and other kinds of heating and reverberatory furnaces, or it may be used for the generation of steam, and for lighting purposes, the pipes or passages in each such case being provided with valves or cocks for regulating the supply.

681.—JOSEPH KNOWLES BROADBENT, of the city of Manchester, in the co. of Lancaster, engineer, for "*Improvements in instruments or gauges for measuring and indicating the pressure and vacuum or differences of pressure and the draughts or blasts of fluids.*" Partly a communication. Patent dated March 15, 1871.

This invention relates to pressure or vacuum gauges, and consists in employing, in addition to an ordinary hand, a separate indicating hand to show fractions of the units. It consists, secondly, in combining with pressure or vacuum gauges dials or pointers to show the maximum degree of pressure within any period after adjustment, these dials or pointers being locked or sealed up if required. Thirdly, it relates to gauges for measuring and indicating draughts in furnaces, flues, or mines, and the pressure of blasts, and for other purposes; and it consists of discs connected to form a pair of bellows; one disc is secured in a case, the other connected with a spring, bell-crank, lever, and wheel-work, to actuate a hand or pointer. In place of the bellows an inverted cup like a gasometer may be used, sealed with mercury.

685.—ALFRED TYLOR, of 2, Newgate Street, in the City of London, brass-founder, for "*Improvements in valve apparatus for regulating the discharge of liquids.*" Patent dated March 15, 1871.

The object of this invention is to regulate the flow of water through closet, bib, sluice, or pump valves, by means of a valve with a spindle closing the top and also the aperture through a valve-seat, and having a piston at the bottom or top of the spindle to act as a cushion in combination with the construction of the valve and its seat, so as to prevent tremor in closing with the stream. The water from below the piston is removed and returned again to the cylinder, in which the piston works through a pipe or by a pump, or between the piston and cylinder, thus regulating the fall of the valve and limiting the time the valve is open. By applying a second piston below or outside the first piston the valve is made to fall by gravity, and by the force of the water against the valve, or by means of a pump, the valve is lifted off and lowered down to its seat independent of gravity and of the pressure from the water-main against the valve. The valve is actuated by water or by a screw or spindle and handle or lever as required, to open and close it for different purposes. The piston is made either above or below the valve, and either tight or loose in its cylinder, in accordance with other arrangements.

702.—COLIN MATHER, of the firm of Messrs. Mather and Platt, of Salford, in the co. of Lancaster, engineer, for "*An improved mode of and apparatus for combining inflammable gas with air.*" Patent dated March 16, 1871.

In combining gas with air for singeing fabrics, gassing yarns, soldering metals, heating calender bowls, and for other purposes, it is essential that the gas and air should be united in certain definite proportions to obtain the most beneficial result, but in drawing gas from the ordinary town's main-pipes such a result is found difficult, if not impracticable, owing to the variations in the pressure on the gas. This invention consists in the use of a fan, the casing of which is provided with an opening for the supply of the gas, another opening for the supply of air, and a discharge-pipe through which the combined gas and air is conveyed to the burners. It is evident that by varying the size of the openings for the air and gas they can be combined in any desired proportion. In performing this invention by preference an ordinary suction fan is employed with central apertures at each side; the apertures at one side are left open for the admission of atmospheric air, and the apertures at the other side are enclosed within a case to which the gas-pipe is connected so that when the fan revolves it draws in the air and gas in the required proportions, and the air and gas when combined are discharged through the usual opening to which the pipe leading to the burners is connected. This may be modified by using two fans, one for gas and the other for air, the discharge-pipes of which are connected before the combined gas and air is conveyed to the burners.

APPLICATIONS FOR LETTERS PATENT.

416.—ALFRED CRESSWELL, of Birmingham, in the co. of Warwick, builder, for "*Improvements in apparatus for straining or filtering liquids.*" Feb. 9, 1871.

427.—CHARLES FRANCES, of Manchester, in the co. of Lancaster, builder, for "*Improvements applicable to privies and the ash-pits connected therewith.*" Feb. 10, 1872.

432.—WILLIAM ROBERT LAKE, of the firm of Haseltine, Lake, and Co., of Southampton Buildings, London, patent agents, for "*Improvements in gas-engines.*" A communication. (Complete specification.) Feb. 10, 1872.

449.—HENRY SCOTT, of Greetland, near Halifax, in the co. of York, cotton-warp maker, for "*Improvements in ventilating sewers and drains.*" Feb. 13, 1872.

453.—PETER DODS DEANS, of Leith, in the co. of Edinburgh, merchant, and DANIEL M'NAUGHTON, of Leith aforesaid, merchant, both partners in the firm of M'Lean and Hope, of Leith aforesaid, merchants, for "*Improvements in the production of sulphate of ammonia.*" Feb. 13, 1872.

461.—EDWARD HENRY BLUNDON and SAMUEL TARLTON CLEAVER, both of Canonbury Road, Islington, in the co. of Middlesex, for "*Improvements in the construction of cocks or taps.*" Feb. 14, 1872.

462.—CHARLES WILLIAM EARLE MARSH, of Laurence Pountney Lane, in the City of London, civil engineer, for "*Improvements in meters or apparatus for measuring water or other liquids.*" Feb. 14, 1872.

465.—DAVID CARTER, of 86, Islingword Road, Brighton, in the co. of Sussex, for "*Improvements in what are known as 'dry-earth' closets.*" Feb. 14, 1872.

470.—MARTIN CARR, jun., of Middlesborough, in the co. of York, architect, for "*Improvements in dry-earth closets.*" Feb. 14, 1872.

472.—THOMAS JOHNSON, of Plumstead, in the co. of Kent, for "*Improvements in the valves for sewers or drains for preventing or arresting the passage of noxious or offensive gases.*" Feb. 14, 1872.

484.—FRITZ HILLÉ, of Flora Villa, Brentford, in the co. of Middlesex, for "*Improvements in the treatment and utilization of sewage and the manufacture of manure therefrom.*" Feb. 15, 1872.

GRANTS OF PROVISIONAL PROTECTION.

2661.—MICHAEL TOSSELL, of 1, Clarence Road, Lower Clapton, in the co. of Middlesex, for "*An improved mode or means of ventilation.*" Oct. 7, 1871.

259.—DANIEL THOMAS BOSTEL, of 21, Ship Street, Brighton, in the co. of Sussex, for "*Improvements in what are known as 'dry-earth closets' and 'urinals.'*" Jan. 27, 1872.

299.—JAMES STEELE, of Sparkbrook, in the co. of Warwick, engineer, for "*An improved claw-wrench for screwing gas-pipes, and for other similar purposes.*" Jan. 31, 1872.

316.—WILLIAM ROBERT LAKE, of the firm of Haseltine, Lake, and Co., of Southampton Buildings, London, patent agents, for "*An improved apparatus for detecting leakages in gas and water pipes and other like fittings or connexions.*" A communication. Feb. 1, 1872.

321.—WILLIAM ROBERT LAKE, of the firm of Haseltine, Lake, and Co., of Southampton Buildings, London, patent agents, for "*An improved burner for lamps and other illuminating apparatus.*" A communication. Feb. 1, 1872.

379.—FRANCIS GERARD PRANGE, of Liverpool, in the co. of Lancaster, merchant, and WILLIAM WHITTHREAD, of the same place, analytical chemist, for "*Improvements in the utilization of sewage.*" Feb. 6, 1872.

388.—ALEXANDER MELVILLE CLARK, of 53, Chancery Lane, in the co. of Middlesex, patent agent, for "*Improvements in the treatment of sewage and other ammoniacal liquors, and in the manufacture of certain salts for this purpose.*" A communication. Feb. 6, 1872.

391.—CHARLES EARDLEY BILLING, of 90, Hatton Garden, in the co. of Middlesex, for "*Improvements in apparatus for heating by the flame of gas.*" Feb. 7, 1872.

INVENTIONS PROTECTED FOR SIX MONTHS ON THE DEPOSIT OF A COMPLETE SPECIFICATION.

432.—WILLIAM ROBERT LAKE, of the firm of Haseltine, Lake, and Co., of Southampton Buildings, London, patent agents, for "*Improvements in gas-engines.*" A communication. Feb. 10, 1872.

375.—HENRI ADRIEN BONNEVILLE, of 6, Piccadilly, in the co. of Middlesex, and 18, Rue de la Chaussée d'Antin, Paris, France, patent agent, for "*Certain improvements in apparatus for lighting gas by electric currents or otherwise.*" A communication. Feb. 5, 1872.

NOTICES TO PROCEED.

2626.—WILLIAM IRLAM ELLIS, of Murray Street, Higher Broughton, Manchester, in the co. of Lancaster, engineer, for "*Improvements in machinery for forcing and exhausting air or other gases.*" Oct. 4, 1871.

2655.—ALFRED HENRY STILL and DENNY LANE, both of Cork, Ireland, for "*Improvements in the manufacture of illuminating gas.*" Oct. 6, 1871.

2659.—JAMES BURROW, of the Hampton Vicarage, in the co. of Middlesex, master of arts, for "*Improvements in treating sewage and other matters.*" Oct. 7, 1871.

2662.—JOHN FREDERICK GUSTAVE KROMSCHROEDER, of Gloucester Street, Regent's Park, in the co. of Middlesex, engineer, for "*Improvements in apparatus for generating inflammable gas or vapour for heating and lighting purposes.*" Oct. 7, 1871.

2718.—WILLIAM HENRY TAYLER, of Tudor House, Anerley, in the co. of Surrey, doctor of medicine, for "*Improvements in stoves for burning gas or gas and air for general heating and cooking purposes.*" Oct. 18, 1871.

3245.—RICHARD BROWN EVERED, of 28, Drury Lane, in the co. of Middlesex, brassfounder, for "*Improvements in taps or valves.*" Nov. 30, 1871.

3344.—JAMES MOFFAT, of the firm of J. F. Allan and Co., of Glasgow, in the co. of Lanark, N.B., gas engineers, for "*Improvements in apparatus for making illuminating gas.*" Dec. 11, 1871.

3515.—HENRY YOUNG DARRACOTT SCOTT, of Ealing, in the co. of Middlesex, major-general, C.B., for "*Improvements in the treatment of sewage water.*" Dec. 29, 1871.

6.—WILLIAM STEBBINS FISH, of 166, Buchanan Street, Glasgow, in the co. of Lanark, N.B., for "*Improvements in the construction of packing for piston-rods, pipe-joints, and other similar purposes.*" Jan. 1, 1872.

31.—WILLIAM ALEXANDER LYTTLE, of the Grove, Hammersmith, in the co. of Middlesex, engineer, for "*Improvements in the preparation and laying down of bituminous asphalte for pavement.*" Jan. 4, 1872.

63.—JOHN FOTHERGILL, of Carshalton, in the co. of Surrey, gentleman, for "*Improvements in fire-irons, whereby gas can be applied to the kindling of fires.*" Jan. 8, 1872.

83.—BRISTOW HUNT, of 1, Serle Street, Lincoln's Inn, in the co. of Middlesex, gentleman, for "*Improvements in meters for measuring water or other fluids.*" A communication. Jan. 10, 1872.

166.—JOHN POLLARD SEDDON, of 12, Park Street, Westminster, in the co. of Middlesex, architect, for "*Improvements in the means of ventilating the sewers, soil-pipes, and cesspools of dwellings, and deodorizing the gases evolved therefrom.*" Jan. 13, 1872.

202.—ANDREW HIGGINSON, of Liverpool, in the co. of Lancaster, marine draughtsman, for "*Improvements applicable to motive-power engines, engine-governors, and pumps.*" Jan. 22, 1872.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

3715.—ARISTIDE BALTHAZARD BÉRARD, "*Improvements in the processes and apparatus for manufacturing, collecting, and purifying gas for heating and other purposes.*" Dec. 7, 1868.

3843.—GEORGE HENRY BENSON and WILLIAM GEORGE VALENTIN, "*Improvements in the generation or production of combustible gases, and in the apparatus employed therein.*" Dec. 17, 1868.

3895.—WILLIAM EDWARD GEDGE, "*An improved construction of cock or tap.*" Dec. 21, 1868.

3910.—JOHN SNAPE, "*Improvements in pumps or apparatus for drawing and forcing fluids, particularly applicable to the ventilation of mines.*" Dec. 22, 1868.

3914.—JOSIAH GEORGE JENNINGS, "*Improvements in apparatus for treating sewage, and for irrigating land with sewage and other waters.*" Dec. 22, 1868.

3923.—ALEXANDER MELVILLE CLARK, "*Improvements in gas-burners.*" Dec. 23, 1868.

3974.—EUGENE THEODORE NOUALHIER, "*Improvements in apparatus for supplying, blowing in, and exhausting air, producing draught, and ventilating.*" Dec. 30, 1868.

90.—BRISTOW HUNT, "*Improvements in water-meters.*" Jan. 12, 1869.

95.—GEORGE VERRELL OSBORNE and ALFRED JAMES PEERLESS, "*An improved ball-valve or cock.*" Jan. 12, 1869.

100.—JAMES STEEL, "*Improvements in sanitary arrangements to be substituted for water-closets.*" Jan. 13, 1869.

105.—WILLIAM ROBERT LAKE, "*An improved method of and devices for uniting the ends of pipes or tubes.*" Jan. 13, 1869.

107.—GEORGE DOMINICUS KITTOE and PETER BROTHERHOOD, "*Improvements in valves.*" Jan. 14, 1869.

148.—FREDERICK BRADY, "*Improvements in the commercial manufacture of sulphate of ammonia.*" Jan. 16, 1869.

154.—NICHOLAS VOICE, "*Improvements in apparatus connected with closets and urinals.*" Jan. 18, 1869.

162.—GEORGE BROWN, "*Improvements in gas-meters and other measures, by apparatus for registering the passage of gas and other bodies.*" Jan. 18, 1869.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £100 BEFORE THE EXPIRATION OF THE SEVENTH YEAR.

186.—JOHN HAYS WILSON, "*Improvements applicable to pumps.*" Jan. 21, 1865.

226.—ALEXANDER ANGUS CROLL, "*Improvements in the purification of coal gas.*" Jan. 26, 1865.

Share List of Metropolitan Gas Companies.

Number of Shares issued.	Amount per Share.	Name of Company.	Amount paid up p. Share.	Dividend p. Cent. p. Annum.	Latest Quotations.
	£		£ s. d.	£ s. d.	£
8000	20	Anglo-Romano	20 0 0	10 0 0	20 — 22
5000	20	Bahia (Limited)	20 0 0	3 0 0	12 — 12
1000	20	Do., preference	20 0 0	10 0 0	23 — 25
750	20	Do., do., redeemable	20 0 0	10 0 0	21 — 23
40000	5	Bombay (Limited)	5 0 0	6 15 0	6 — 6¼
10000	5	Do., third issue	4 0 0	6 15 0	1 —1¼ pm.
10000	20	British (Limited)	20 0 0	10 0 0	33 — 34
		(Norwich, Hull-Sculcoates, Hanley, Tunstall & Shelton (Potteries), Trowbridge., and Holywell.)			
7500	20	Cagliari (Limited)			
112000	10	*Chartered*	20 0 0	7 0 0	18 — 20
10000	10	Do., B shares, 4 per cent. max.	10 0 0	8 0 0	15½— 16½
25000	10	Do., 5 per cent. preference	10 0 0	4 0 0	7½— 8
20000	10	Do., 5 per cent. preference, second issue	10 0 0	5 0 0	13 — 14
20000	10	Do., 10 per cent. preference	8 0 0	5 0 0	2½—3¼pm.
	25	Do., D shares	10 0 0	10 0 0	20½— 20¾
17490	25	*Commercial*	25 0 0		49 — 50
20000	20	Continental Union	25 0 0	10 0 0	42 — 44
10000	20	Do., new	20 0 0	8 0 0	26½— 27½
5213	20	Do., preference	7 10 0	8 0 0	3 —3¼ pm.
		(Grmny.: Strsbg. France: Cette, Nismes, Montargis Vienne, Roanne, Beaucaire, Ruell, Albi. Italy: Milan, Genoa, Parma, Modena, Alessandria, Messina.)	20 0 0	7 0 0	25 — 27
5000	10	*Crystal Palace District*			
5000	10	Do., preference	10 0 0	10 0 0	16½— 17½
6624	10	Do., new shares	10 0 0	6 0 0	12 0 0
3376	10	Do.	10 0 0	7 0 0	13 0 0
23406	10	European (Limited)	1 0 0	7 0 0	1 10 0
12000	10	Do., new shares	10 0 0	11 0 0	15¼— 16½
		(Boulogne, Amiens, Rouen, Caen, Havre, & Nantes.)	5 0 0	11 0 0	3 —6½ pm.
5000	10	Hong Kong (Limited)			
1560000	100	*Imperial*	10 0 0	10 0 0	13½— 14½
26000	12½	Do., new shares	100 0 0	10 0 0	171 —174
25000	12½	Do., new shares, 1870	12 10 0	7 0 0	16½— 16¾
1300	100	Do., bonds	7 10 0	7 0 0	3½— 3¾
56000	50	*Imperial Continental*	£100	10 0 0	195 —200
		(Amsterdam, Berlin, Ghent, Hanover, Lille, Rotterdam, Aix-la-Chapelle, Antwerp, Bordeaux, Brussels, Cologne, Frankfort-on-Maine, Haarlem, Stolberg, Toulouse, & Vienna.)	45 15 0	9 2 6	69 — 70
400	100	Imperial Mexican (Limited)			
200	100	Do., new	100 0 0	nil.	
3000	40	*Independent*	100 0 0	nil.	
3000	10	Do.	40 0 0	10 0 0	68 — 70
3000	20	Do.	10 0 0	5 0 0	8 — 9
250000	Stk.	*London*	20 0 0	7 10 0	25 — 26
24000	Stk.	Do., 1st preference	100 0 0	10 0 0	168 —171
	Stk.	Do., 2nd preference	100 0 0	6 0 0	120 —124
	Stk.	Do., 3rd preference	100 0 0	6 0 0	
£18781	100	Do., 1st preference stock	100 0 0	6 0 0	
£11828	100	Do., 2nd preference stock	100 0 0	6 0 0	129 —131
		Nietheroy, Brazil (Limited)	100 0 0	5 0 0	103 —105
15000	5	Malta and Mediterranean (Limited)			
6000	5	Do., preference	5 0 0	5 0 0	3½— 4¼
20000	5	Mauritius (Limited)	5 0 0	7 0 0	5½— 5¾
30000	5	Oriental (Calcutta)	2 0 0	6 0 0	2½— 2¾
30000	5	Do., new shares	5 0 0	9 0 0	6¾— 7¼
10000	5	Ottoman (Limited)	2 10 0	9 0 0	2—1¾ pm.
14000	10	Pará (Limited)	5 0 0	nil.	2 — 2½
27000	20	*Phœnix*	10 0 0	8 0 0	10¾— 11¼
3600	100	Do., new	20 0 0	10 0 0	33 — 34
144000	Stk.	Do.	45 0 0	7 10 0	17—19 pm.
5000	20	*Ratcliff*	100 0 0	5 0 0	90 — 92
30000	20	Rio de Janeiro (Limited)	20 0 0	10 0 0	33 — 35
6959	5	Singapore (Limited)	20 0 0	10 0 0	33½— 34½
2000	5	Do., preference	5 0 0	6 0 0	
1500	32½	Shanghai	5 0 0	7 10 0	
4000	50	*South Metropolitan*	32 10 0	12 0 0	
4000	12½	Do.	50 0 0	10 0 0	90 — 92
20000	12½	Do., new shares	12 10 0	10 0 0	21¼— 22½
15000	10	*Surrey Consumers*	2 10 0	10 0 0	5 —5½ pm.
10000	10	Do., new	10 0 0	10 0 0	17 — 18
9000	4	United General (Limerick)	6 0 0	10 0 0	4¼— 5¼
1500	10	*Wandsworth and Putney*	4 0 0	5 0 0	3 — 3½
1500	10	Do.	10 0 0	10 0 0	13 — 14
1819	10	Do.	10 0 0	7 10 0	7½— 8
1138	10	Do.	10 0 0	7 10 0	
20000	10	Western (Limited) A shares	5 0 0	7 10 0	
10000	10	Do., B shares	10 0 0	10 0 0	16½— 17½
10000	10	Do., C shares	9 0 0	10 0 0	6¼—7 pm.
20000	10	Do., D shares	9 0 0	10 0 0	6¾—7 pm.
16000	5	*West Ham*	1 0 0	10 0 0	3½—3¾ pm.
10000	5	Do., new shares	5 0 0	8 0 0	7½— 7¾
551	10	West London Junction (Limited)	1 0 0	8 0 0	1½— 1¾
520	10	Do., preference	10 0 0	6 0 0	

Price Current.

WROUGHT-IRON TUBING,

Subject to 60 per cent. Discount.

	½ in.	¾ in.	1 in.	1¼ in.	1½ in.	2 in.
Patent Welded Tubes, from 2 to 14 feet—per foot	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Ditto ditto, from 12 in. to 23½ in.—each	1 0	1 3	0 11	0 8	0 6	0 4½
Long Screws, from 12 in. upwards	3 0	2 0	1 8	1 4	1 0	0 9
Bends and Springs	4 0	2 6	2 0	1 6	1 2	0 11
Square Elbows, equal or reducing; Round Elbows, 5 per cent. extra	4 3	2 3	1 9	1 3	0 11	0 8
Tees, wrought or cast	3 6	2 3	1 9	1 3	0 10	0 8
Crosses, ditto, equal or reducing	5 0	3 6	2 6	1 9	1 3	0 10
Iron Cocks	4 3	3 6	2 6	2 3	1 9	1 3
Ditto, with brass plug	10 0	11 0	3 6	2 6	1 9	1 3
Diminishing Sockets, Caps, Plugs, and Nipples	22 0	19 0	15 0	10 0	7 6	4 6
Plain Sockets	1 3	0 11	0 7	0 7	0 6	0 4
Syphons, 3-quart	1 0	0 7	0 4	0 4	0 3½	0 3
	23 0	19 0	18 0	17 0	16 0	—

CASTINGS.—*Per Ton.*

Average Weight of Cast-iron Gas-pipes, per Yard.

1 in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lb.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle and Middlesboro'.	Wales.	Yorkshire, Derbyshire, and Staffordshire
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Pig Iron, No. 1 (g.m.b.)	4 15 0	5 17 0	4 0 0	4 10 0	4 10 0
1¼ and 2-inch Socket-pipes	8 12 6	7 12 6	7 10 0	7 17 6	8 2 6
3 and 3-inch ditto	7 17 6	6 17 6	6 10 0	6 17 6	7 2 6
4 and 5-inch ditto	7 12 6	6 12 6	6 7 6	6 15 0	7 0 0
6 inches and upwards ditto	7 7 6	6 7 6	6 2 6	6 10 0	6 17 6
Retorts, 1st fusion, hot blast	7 2 6	6 2 6	5 17 6	6 12 6	7 2 6
Ditto, 2nd ditto, cold ditto	8 2 6	7 2 6	6 17 6	7 12 6	8 2 6
Tank-plates, ¼ thick and above	7 12 6	6 12 6	6 7 6	7 2 6	8 12 6

FREIGHTS.

Coastwise—Newcastle:—	Per Ton.	*Foreign.—*	Per Keel.
Chatham and Rochester	7s. 6d	Barcelona	£19 0s
Cork	8 3	Bordeaux	10 0
Dover, Folkestone, & Ramsgate	8 0	Boulogne and Calais	8 10
Dublin	8 6	Cadiz	£11 10s. to 12 0
Exeter Quay	9 0	Cronstadt	—
Ipswich	6 9	Copenhagen	9 0
London (from Leith)	—	Genoa	18 0
London (Pool)	7 6	Hamburg	—
Lowestoft and Yarmouth	5 9	Havre de Grace	11 0
Portsmouth & Southampton	8 6	Leghorn	16 0
Plymouth	10 0	Lisbon	9 10
Shoreham	8 0	Rotterdam	£9 10s. to 10 0
Whitstable	8 0	Stettin	10 0
Weymouth	8 3	Trieste	21 10
		Venice	21 0

SUNDRIES.

Best Newcastle Fire-bricks, per 1000	£2 10s. to £2 15s. 0d.
Cliff's Fire-bricks (at Wortley), per 1000	2 15 6
Ingham's ditto (at Wortley), per 1000	2 15 0
Farnley Iron Co.'s Fire-bricks (at Wortley), less discount	2 17 0
Fire-clay Retorts, per foot run	5s. 6d. to 0 7 6
Tarred Rope Yarn, per cwt.	1 0 0

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201, UPPER THAMES STREET,

London,

GAS & WATER ENGINEERS.

CONTRACTORS FOR THE SUPPLY OF

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JAMES MILLER, SON, & Co.,

1, GREAT ST. HELEN'S. LONDON, E.C.,

AND

75, UNION STREET, GLASGOW.

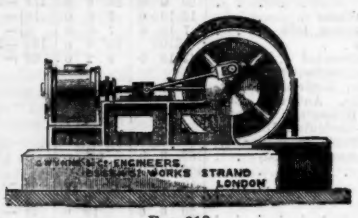


FIG. 213.

FIG. 211.

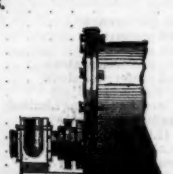


FIG. 219.

GWYNNE & COMPANY,

HYDRAULIC, MECHANICAL, & GAS ENGINEERS,

ESSEX STREET WORKS, STRAND,

London, W.C.,

SOLE MANUFACTURERS OF

BEALE'S IMPROVED PATENT GAS-EXHAUSTER,

Under the personal superintendence of Mr. BEALE.

REDUCED PRICES AND INCREASED CAPACITY.

Also manufacturers of Improved Hydraulic Regulators, to actuate a steam or gas throttle-valve to suit the make of gas; self-acting bye-pass valves, to move by hand or otherwise; improved stop-valves, with faced flanges, forming the neat adjunct to Exhauster of valve and elbow combined. Exhausters manufactured on the new principal have given the utmost satisfaction, and can be seen working at several large Gas-Works in London. G. & Co. are now engaged in manufacturing the largest Gas-Exhausters in the world, with engines complete.

The Gas-Exhausters may be made with inside or outside bearing, as shown in Figs. 211 and 219.

Fig. 213 shows the Improved Gas-Exhauster attached to, and driven by one of GWYNNE AND CO.'s well-known high-speed Horizontal Steam-Engines, without any intermediate gearing. This arrangement is extremely compact, and is beautifully adapted for small or large Gas-Works, and the foundations and erection are both very simple and inexpensive.

Prices and every information upon application to GWYNNE AND CO. *as above.*

DUKE OF HAMILTON'S
LESMAHAGOW GAS COAL.

The superior quality of this well-known Cannel, as wrought by

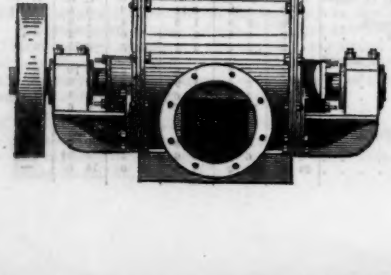
THE NITSHILL AND LESMAHAGOW COAL COMPANY,

Is now generally admitted by all Gas Engineers.

PRICE AND ANALYSIS MAY BE HAD ON APPLICATION TO

JAMES M'KELVIE, HAYMARKET, EDINBURGH.

BEALE'S GAS-EXHAUSTER IMPROVED.



FROM 250 TO 250,000 CUBIC FEET PER HOUR.

Since Mr. BEALE'S retirement, the Oldest Makers are

J. BURTON, SONS, AND WALLER,

MAKERS OF ENGINES, MACHINERY, and IRONWORK for GAS-WORKS.

Efficient and durable TAR, LIQUOR, and SYPHON PUMPS.

GAS-VALVES in stock, 2 inches to 30 inches.

SELF-ACTING BYE-PASS VALVES, with Lid and Relieving Lever,

ROTATORY, TUMBLER, and CAPILLARY WATER DISTRIBUTORS for SCRUBBERS.

EXHAUSTERS from 3000 to 30,000 per hour in stock.

HOLLAND STREET, BLACKFRIARS, LONDON, S.E.,

Between Blackfriars' and Southwark Bridges.

WANTED, an experienced Gas-Fitter, one with a thorough knowledge of his duties. Must understand the laying of mains and services. A married man preferred. It would be permanent, and preference would be given to any one with a knowledge of gas-making. Good house, coal, and gas free.

Address, with testimonials, stating age, with salary required, to SECRETARY, Gas-Works, BROMSGROVE, on or before the 18th day of March next.

WANTED, a Manager for a Gas-Work producing about 4,000,000 feet per annum, in a country town of about 4000 inhabitants. He must understand practically stoking, retort-setting, main and service laying, meter-taking, and general fitting and repairs. A good house with coal and gas free.

Address, in applicant's own handwriting, stating whether married or single, salary required, and references for character and ability, to LUX, Box 5, Post-Office, HULL.

WANTED, an efficient Working MANAGER for a small Gas-Work. Must understand meter-fixing, retort-setting, and the general routine of a Gas-Work. Wages £2 a week, house, firing, and gas. Must find and pay for whatever assistance he may require.

Apply, with reference, &c., to Mr. CRAMP, Secretary, Gas-Works, EAST GRINSTEAD.

MILNROW GAS-WORKS.

WANTED, a Working Manager for the above Company, who can undertake the whole charge of the works, and keep accounts. Security will be required.

Applications, stating salary required, to be sent in not later than Monday, the 11th day of March, 1872. Any other information may be had at the Office.

R. WHITWORTH, Secretary.

WANTED, a Man to undertake the Making of Gas in a village in Hertfordshire. He must understand a little of gas-fitting.

Apply to Mr. ISAAC DOWSE, King's Langley, WATFORD.

WANTED, by a young Man, a situation as Meter Fixer, Fitter, Index Taker, &c.

Address A. B., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a situation as Working MANAGER of Gas-Works, where the annual make is from 7,000,000 feet upwards. Ten years experience in the manufacture of gas, fitting, &c. Unexceptionable reference. Aged 30.

Address T. E. S., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO GAS COMPANIES.

THE Advertiser, who has had many years experience, both practically, and theoretically, as a Master Gas-Fitter and Gas-Fitting Manufacturer, is desirous of an engagement as MANAGER of the aforesaid business in connexion with a Gas Company. He is well-known to some of the best manufacturers of Gaseliers and Gas-Fittings, and can give estimates for gas-fitting works.

Apply by letter, addressed A. B., care of Mr. LEONI, 34, St. Paul's Street, NEW NORTH ROAD.

TO GAS COMPANIES AND OTHERS.

THE Advertiser is open for an engage- ment as MANAGER. For the past six years has had the management of a work where the make is over 30 millions annually. The highest testimonials given.

Apply to A. D., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO GAS MANAGERS.

THE Directors of the Lurgan Gaslight Company will, at their meeting to be held on the 7th of March next, at 12 o'clock, noon, proceed to elect a MANAGER for their works, at a salary of £120 per annum, in addition to which he will have a free house and garden, with coal and gas. A married man will be preferred.

The person elected will be required to take charge the first week in April.

Applications, enclosing testimonials, will be received by me up till the 6th of March next, and candidates must be in attendance at the board on the day of election.

The present make of gas is about 8,000,000 cubic feet annually.

By order,
Feb. 22, 1872. W. BAIRD, Secretary.

GASHOLDER WANTED, in good condi- tion, suitable for exportation, of 50 to 80 ft. in diameter, with tank and all appliances, in thorough good working order.

Address, with all particulars, to Messrs. HICKIE, BORMAN, AND Co., 127, Leadenhall Street, LONDON, E.C.

GAS SHARES.

FOR SALE, a few fully Paid-up Shares in a Provincial Gas Company, in work and paying dividend, in an increasing neighbourhood a few miles north-east of London.

For particulars, apply to A. B., care of Mr. DENNY, 55, Coleman Street, LONDON.

FOR SALE—Two Gasholders (new), one 30 ft. diameter, 14 ft. deep; one 30 ft. diameter, 10 ft. deep. These Gasholders were made before the advance in the price of iron, and can be erected at a moderate price.

Apply to ED. COCKEY AND SONS, Gasholder Manufacturers, FROME.

GASHOLDER.

FOR SALE, a capital bargain, one good GASHOLDER, diameter 34 ft. 6 in., depth 18 ft.; tripod columns, central guide, chains, weights, &c. Price £50. To be removed for extension of works.

May be seen by applying to JAMES HIGGINSON, Manager, Gas-Works, HOLMFIRTH.

FOR SALE, Two Purifiers in excellent condition, each 10 ft. 4 in. square by 4 ft. 8 in. deep, with cast-iron covers. Two 12-in. centre-valves, with self-acting syphons, connexions, &c. Two 12-in. bye-pass valves.

Apply to the Sheffield United Gaslight Company, Shude Hill, SHEFFIELD.

MANCHESTER DISTRICT ASSOCIA- TION OF GAS ENGINEERS.

The NINTH QUARTERLY MEETING will be held at the Mitre Hotel, Cathedral Gates, Manchester, on SATURDAY, March 2, 1872, at 2.30 p.m.

PAPERS:

"On Gas Manufacture," by Mr. LYON, Gas Engineer, Manchester.

"On Retorts built in Sections," by Mr. JAQUES, Gas Engineer, Stockport.

W. LONGWORTH, Hon. Secretary.

FOR SALE, a second-hand Gas Apparatus, in good condition. Suitable to make gas for, and supply, 250 or 300 lights.

For particulars apply to D. HUNTER, Jun., 15, Clarence Street, GREENWICH.

TO GAS COMPANIES AND OTHERS.

ON SALE, at the Gas-Works, Cheltenham, Two STATION-METERS, in good working order; one 30,000 cubic feet per hour, by Laidlaw, and one 12,000 cubic feet per hour, by Wright, both with inlet and outlet connexions and valves complete.

A BEALES EXHAUSTER, 20,000 cubic feet per hour.

Also a 60 ft. by 30 ft. TELESCOPE GASHOLDER, with columns, girders, and counterbalance.

Particulars may be obtained on application to R. O. PATERSON, Engineer, Gas-Works, CHELTENHAM.

TO GAS COMPANIES AND OTHERS.

ON SALE, at the Gas-Works, Holyhead, two GASHOLDER FRAMES without the Sheets—first 35 ft. diameter, 14 ft. deep. Top and bottom curbs, centre pipe, and truss cup; 8 main bars, 3 sets of bracket bars with tension and suspension rods; 4 strong cast-iron columns, 15 feet 6 in. long, 9 in. base, 8 in. tops; 4 guides in tank, and 4 wrought-iron girders; 4 sets of pulleys, chains, and balance-weight; 4 sets of pulleys and fixings on top of holder.

Also a small GASHOLDER, 25 ft. by 12 ft. deep; 4 cast-iron columns, 14 ft. long, 8 in. by 6 in. at top, with top and bottom curbs, main bars, bracket bars, pulleys and fixings, chains, and balance-weights complete, equal to new.

Also 20 feet of Hydraulic Main, 16 in. diameter, with dip-pipes, H and ascension pipes, 4 in. diameter.; 16 Mouth-pieces, 15 in. diameter, all in good condition; also a quantity of old Sheets and old Castings.—By order of the Board,

JOHN ROBERTS, Manager.

TO GASHOLDER MAKERS.

THE Corporation Gas-Works Manage- ment Committee invite TENDERS for the completion or telescoping of two 80 ft. diameter GASHOLDERS, together with the necessary columns, framings, &c.

Plans and specification may be seen, and further particulars obtained, at the Gas-Works.

The Committee will not bind themselves to accept the lowest or any tender.

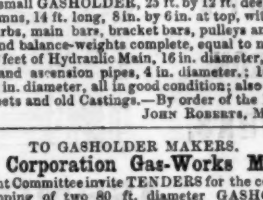
Sealed tenders, endorsed "Tender for Gasholder," to be sent in on or before Tuesday, the 5th day of March, 1872, to WM. FORD, Engineer, Gas- Works, STOCKTON-ON-TEES.

TO IRONFOUNDERS, &c.

THE Corporation Gas-Works Manage- ment Committee invite TENDERS for the supply and erection, at their works, of Four PURIFIERS, 14 ft. by 20 ft., according to plans and specification which may be seen, and further information obtained, at the Gas-Works.

The Committee do not bind themselves to accept the lowest or any tender.

Sealed tenders, endorsed "Tender for Purifiers," to be sent in not later than Tuesday, the 5th day of March, 1872, to WM. FORD, Engineer, Gas-Works, STOCKTON-ON-TEES.



CLOTH GAS-BAGS for MAINS, as sup- plied to the Imperial, Chartered, and other London and Provincial Gas Companies. Bellows and Valves for inflating Well Dresses, Stokers Gloves, India-Rubber Suction and Delivery Hose, Gas-Tubing, Leather, India-Rubber and Gutta-Percha Machine-Bands, Sheet and Washers for Steam Joints.

T. BUGDEN, Manufacturer, 79, Goswell Road, LONDON, E.C.

BOX'S PATENT FASTENING FOR **RETORT-LIDS.**

The above description of Fastening has been in successful use for a considerable time, and can be supplied at a much more economical rate than the ordinary cross-bar and screw.

For prices and particulars, apply to W. BOX, Gas-Works, Crayford, KENT.

TO GASHOLDER MAKERS.

THE Directors of the Southbank and Normanby Gas Company, Limited, are prepared to receive TENDERS for the construction of a Single-Lift GASHOLDER, 80 feet in diameter by 20 feet deep, to be erected at their Gas-Works at Southbank.

Drawings and specifications may be inspected at the Offices of the Company, at Southbank, and copies will be supplied on payment of One Guinea.

Tenders addressed to me, endorsed "Tender for Gasholder," must be delivered at the Offices of the Company on or before Friday, the 1st day of March, 1872.

The Company do not pledge themselves to accept the lowest or other tender.—By order,

H. HARKENWITH, Secretary.

Southbank, Yorkshire, Jan. 24, 1872.

MANUFACTURE AND DISTRIBUTION ACCOUNTS.

Mr. W. J. WARNER

Begs to say that in consequence of the number of inquiries he has received relative to the above form of Accounts, which he had the pleasure of submitting to the

BRITISH ASSOCIATION OF GAS MANAGERS,
AT THEIR LATE MEETING IN DUBLIN,

he has been induced to publish them, and is now prepared to supply the two sheets, post free, for 5s.

Applications to be made to

Mr. W. J. WARNER,
Engineer,
GAS-WORKS, SOUTH SHIELDS.

Mr. ALFRED LASS,

WANDSWORTH, LONDON, S.W.,

Is prepared to open the Books, and, if necessary, keep the Accounts of Gas and Water Companies.

To examine the Books and Accounts, and prepare Balance-Sheets for the information of Directors.

To assist Secretaries in preparing Balance-Sheets, according to the "Gas-Works Clauses Act, 1871;" or may be consulted with respect to Accounts generally.

SAMUEL PONTIFEX, Consulting Gas Engineer, having retired from the Great Central Gas Company, is now prepared to furnish PLANS and SPECIFICATIONS, as well as ADVISE Provincial Gas Companies as to the erection of new, or alteration and enlargement of existing works.

Offices: 22, Coleman Street, LONDON, E.C.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 42, Parliament Street, WESTMINSTER. [Office of the JOURNAL OF GAS LIGHTING, &c.]

CLAYTON'S PATENT SIX-WAY VALVE only requires one valve to work two purifiers saves more than three-fourths of the connexion-pipes; requires neither tee s elbows, nor bends; no racks or springs to get out of order.

For particulars, apply to CLAYTON, SON, & Co., Gas Engineers, Hunslet, LEEDS.

CAST-IRON Retorts, Socket-Pipes, with Syphons, and all requisite Connexions, Lamp Columns, Wrought-Iron Tubing, Valves, Street-Lamps, Sight Holes, Furnace Doors, Ash-Pans, Charging and Coke Shovels, Iron Pails, Coke Barrows, Cross Bars, Fire Pots, Pumps, and Iron Borings.

PURIFIERS, CONDENSERS, & SCRUBBERS erected complete, or the materials supplied; and every description of goods in use by Gas-Works, in stock, at wholesale prices, at

Mr. LYNCH WHITE'S,
Old Barge Iron Wharf, Upper Ground Street, LONDON.

EDGE'S PATENT

FOR REMOVING THE

CARBONACEOUS INCRUSTATION FROM GAS-RETORTS.

"*Gas-Works, Bury St. Edmund's, Oct.* 24, 1870.

"Dear Sir,—In answer to your inquiry about Edge's patent method of scurfing Retorts, I beg to inform you that I can give it my unqualified recommendation.

"Some years ago, in order to facilitate the scurfing process, I introduced open-ended Retorts here, and found them a great improvement upon the common Retorts, which, in addition to the damage they received at scurfing times, were very leaky for several days afterwards. Even with that plan there was a considerable amount of labour and care, which I have avoided since the adoption of Edge's method.

"I find the amount paid for royalty less than the entire cost of open-ended Retorts; and in addition, that less labour is required and less damage is done to the Retort in scurfing.

"As Edge's method does not burn the carbon out of the cracks so much as most other plans, and my stokers are pleased with it, I regard it as invaluable in reducing one of the anxieties of the gas manufacturer.

"Having a steam-engine on the premises, it was easy of adoption here, but my opinion of it is so high that I would recommend all gas managers who are not so situated, to provide themselves with a portable steam-boiler, and am sure that they will never regret the investment.—I am, dear sir, yours truly,

"THOS. H. METHVEN.

"E. Goddard, Esq."

For particulars and terms, apply to E. GODDARD, Sole Agent, Gas-Works, IPSWICH.

OXIDE OF IRON.—

We are prepared to supply, on moderate terms,

HYDRATED PEROXIDE OF IRON (BOG OCHRE),

Same quality as supplied by us to several of the most extensive Gas Companies, and which has given entire satisfaction.

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BELFAST.

Demy 8vo., half bound roan, cloth sides, lettered, price 7s. 6d., by post 8s.,

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GAS MANAGER'S HANDBOOK,
CONSISTING OF
TABLES, RULES, AND USEFUL INFORMATION
FOR GAS ENGINEERS, MANAGERS,
AND OTHERS ENGAGED IN THE
MANUFACTURE AND DISTRIBUTION
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COAL GAS.
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PRICE TO GAS COMPANIES,
£1 per 100; £3 15s. per 500; or £6 per 1000.
Address, MAGNUS OHREN, Gas-Works, Lower Sydenham, London, S.E.

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THE Electric Telegraph Department of our business is most efficiently conducted by an experienced staff. CONTRACTS entered into for maintenance and erection of lines for Gas and Water Companies, private residences, hotels, &c. Bailey's simple A B C instrument is stronger and less liable to derangement than any other in the market. Price £6 per pair. Makers of maximum and minimum Electrical Indicators and Signals for Reservoirs. Water Pressure Recorders. Managers of Gas and Water Works are invited to ask us for our quotations, or for any information connected with Telegraphy.

Just published, 800 engravings, 4to., post free 2s. in stamps, weight 10 oz., cost of production £1000,
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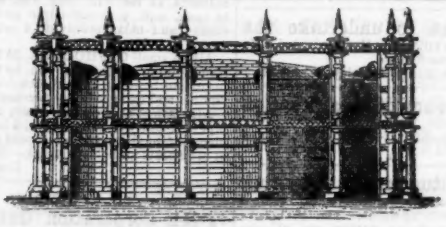
J. BAILEY and Co., Albion Works, Salford, Lancashire.

TO GAS COMPANIES, ENGINEERS, CONTRACTORS, AND OTHERS.
HENRY SKOINES
Is prepared to undertake, by Contract or otherwise, the
SETTING OF EVERY DESCRIPTION OF
RETORTS, STEAM BOILERS, &c.,
With great economy of fuel and durability of workmanship.
Alterations and Repairs of all kinds. For references, &c.,
7, ARGYLE STREET, KING'S CROSS, W.C.

THOMAS PROUD,
GAS ENGINEER, CONTRACTOR FOR GAS-WORKS,
AND FOR
LAYING MAINS FOR GAS AND WATER,
Respectfully invites attention to his
WOOD GRIDS FOR PURIFIERS AND SCRUBBERS,
Which he manufactures by improved Steam Machinery from well-seasoned Timber.
EXPERIENCED WORKMEN SENT OUT FOR SETTING RETORTS & ERECTING APPARATUS.
7, UNETT STREET, St. GEORGE'S, BIRMINGHAM.

HOPE IRON WORKS,



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ASHMORE & WHILE,
GAS ENGINEERS & CONTRACTORS,
MANUFACTURERS OF GASHOLDERS,
GAS APPARATUS OF EVERY DESCRIPTION,
Including Improved
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N.B.—Estimates for all Gas Plant and Remodelling supplied on application.

Established

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MANUFACTURERS OF ALL DESCRIPTIONS OF
FIRE GOODS, and Salt-Glazed Drain-Pipes.
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Where is always kept a Stock of Retorts, Fire-Bricks, Terra Cotta Ware, and Drain-Pipes.

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WITH SPECIAL FACILITIES FOR ADJUSTMENT AND REPAIR,
The principal parts of the mechanism being accessible by the removal of a single Screw.
GAS-METERS on the WET and DRY principles made in CAST-IRON and TIN-PLATE CASES.
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Is guaranteed to prevent and arrest Rust on all Ironwork, and to cover Tar most effectually. It is most valuable for protecting Iron from the action of salt water, rain, sulphurous and gaseous exhalations; it has been well tested at various Gas-Works, in covering Tar on Gasholders, Purifiers, &c., and has given great satisfaction. Sample cans for trial sent free of charge. All communications to be addressed to

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Sole Proprietors of CALLEY'S GENUINE TORBAY PAINTS.

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Price 1s. 6d. each.

Produce nearly 50 per cent. more light than common burners with same gas. They regulate the gas by meansof a moveable Round Ball, and with a PRIVATE KEY,which fits in the RAREFIER. An important result is further obtained *without moving* the Burner; indispensable for Dwelling-houses, Shops, and STREET LAMPS, and equally suitable for HIGH or LOW PRESSURES, by which consumers can adjust the RAREFIER to give as much or as little light as desired, so that the consumption cannot be altered by unauthorized persons.

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Extract from Report by Dr. Letheby:—

"The results have been very remarkable, for they show an average increase of 63 per cent. on the illuminating power of the gas. I am of opinion, therefore, that the invention is of great practical value."

Extract from Dr. Frankland's Course of Lectures at the Royal School of Mines, February, 1868.

"Scholl's Platinum Perfecter is one of the most important inventions of modern times in connexion with the burning of coal gas."

Price 1s. each for Fishtail Burners.

To be had retail of Gas-Fitters and Ironmongers.

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Terms on application. N.B.—A specimen sent free on receipt of Twelve stamps.

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Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,
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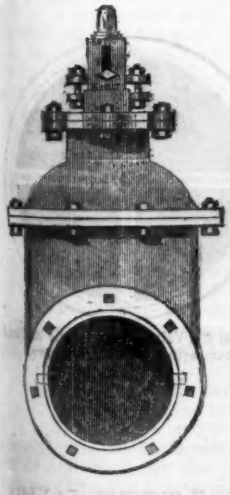
Station-Meters, Governors, Consumers Meters, Gas Lustres, Chandeliers, Brackets, &c., and every description of Gas-Fittings and Gas Apparatus.

C. & W. WALKERS'
DOUBLE-FACED GAS-VALVES.



These solidly constructed double-faced Gas-Valves are intended to supersede the old system of the light, single-faced disc, which is too uncertain and unreliable in large bores.

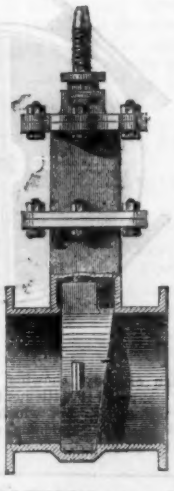
These Valves are guaranteed absolutely gas-tight. They are very massive and rigid, and by improved modes of manufacture they are produced at very little excess in cost over the old light, weak system, which is liable to spring and bend, and become leaky.

The Valve is a rigid wedge of solid cast iron, having two perfectly scraped surfaced facings fitting between the two on the body, which are also surfaced.

A spring in two short halves, and, therefore, not liable to break, is used only for scraping the front facing clean.

The front facing is vertical; the back facing forms the wedge.

At a slight additional expense both flanges are faced to bolt to main-pipes.



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WET & DRY GAS-METER MANUFACTURERS,

STATION-METERS ANY SIZE,

PHOTOMETERS, EXPERIMENTAL METERS, &c.

GAS-METER WORKS, CROSS CAUSEWAY EDINBURGH.

B. CARPENTER'S
IMPROVED WOOD SIEVES
FOR
GAS PURIFIERS & SCRUBBERS.

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The above Sieves are used by all the Gas Companies in London and a great many in the country. Their utility, durability, and cheapness combined, render them superior to all others.

Testimonials from Gas Engineers who have tested their qualities forwarded on application.

All orders punctually attended to, and estimates given if required.

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"HONOURABLE MENTION" for
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All sizes up to 4 ft. diameter;
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J. T. B. PORTER & CO.,
GAS ENGINEERS,
MANUFACTURERS AND CONTRACTORS FOR GAS-WORKS
Of any extent at Home and Abroad,
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BRONNER'S PATENT GAS-BURNERS give 99 per cent. of light, as compared with 27 per cent. given by ordinary burners, with equal consumption of gas.—*Vide* "Gas Referees Report," published June, 1869.

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CATHELS & TERRACE'S Patent Four-WAY DISC GAS-VALVE is the simplest and best Valve for Purifiers, and as a By-pass for other apparatus in Gas-Works. It is always gas-tight, and has no springs, ground faces, or other delicate parts. By its use the flow of the gas cannot be accidentally stopped, and it never sticks.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, Foundry and Brass Works, ROTHERHAM.

CATHELS'S Patent District Dry Gas-GOVERNOR is the only perfect self-acting contrivance for Regulating the Pressures in the higher levels of a district.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, ROTHERHAM.

BELGIAN CLAY RETORTS.

J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

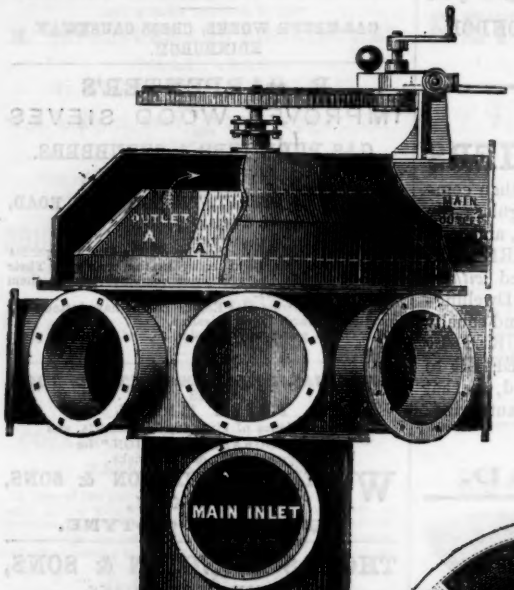
Communications addressed to J. SUGG & CO., GHENT, will receive immediate attention.

JAMES OAKES & CO.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
WENLOCK IRON WHARF, 20 & 22, WHARF ROAD, CITY ROAD, LONDON, N.,

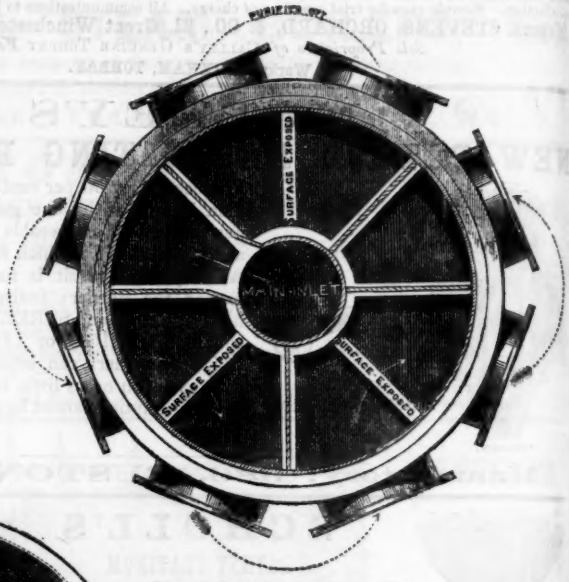
Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including Iron Retorts, Socket and Flange Pipes, Bends, Branches, and Syphons of all sizes, Lamp Columns, &c., &c.

N.B.—Orders for Cast-Iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention. CHARLES HORSLEY, Agent.

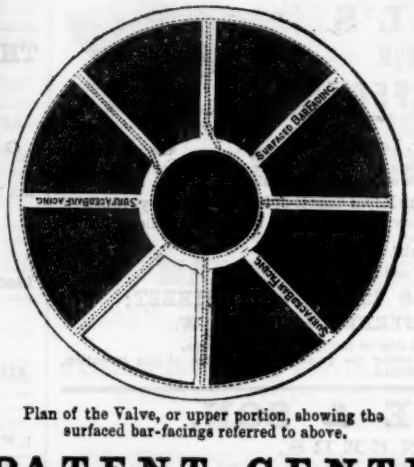
C. & W. WALKERS' PATENT CENTRE-VALVES.



Elevation of the Centre-Valve for four Purifiers. The safety cover is shown broken, to enable the Valve itself, which is inside, to be seen.



Plan of the Body, showing the Valve lying in it, with three of the facings, which were formerly exposed to settlements of dirt, carbon, naphthaline, &c., but which are now always covered by the surfaced bar-facings of the Valve. (See below.)



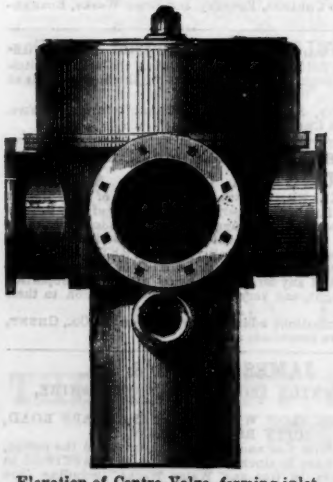
Plan of the Valve, or upper portion, showing the surfaced bar-facings referred to above.

THESE PATENT CENTRE-VALVES

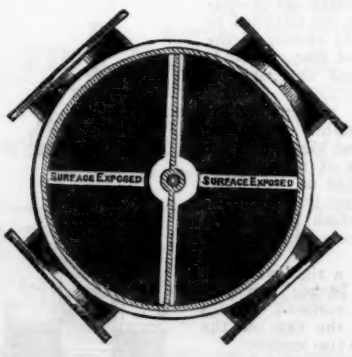
Are the most perfect and certain means for Working Purifiers.

The Valve itself is protected from all injury inside the safety cover. The working of the Valve is so easy, and so governed by the stop-catch movement, that the Purifiers can be instantaneously changed in the dark as well as in daylight. They are scraped perfectly true, metal to metal, the facings heretofore exposed are always covered, and there is nothing more reliable, certain, and durable in a gas-works. By their use the floor of the Purifying-house is clear and level; the Valve and all connexions being beneath the floor, out of the way of working. A very considerable improvement and saving is effected in the cost of the connecting-pipes.

FOUR-WAY CENTRE-VALVE, FORMING INLET, OUTLET, AND BYE-PASS.



Elevation of Centre-Valve, forming inlet, outlet, and bye-pass.



Plan of Body, showing the two facings formerly exposed to settlements of dirt, carbon, naphthaline, &c., but which are now covered by the surfaced bar-facings of the Valve.

Plan of the Valve, showing the surfaced bar-facings referred to above.

MIDLAND IRON-WORKS, DONNINGTON, near NEWPORT, SHROPSHIRE; 8, FINSBURY CIRCUS, LONDON.

THE SEWAGE DISINFECTING & MANURE COMPANY, LIMITED.

(HILLE'S SYSTEM.)

Incorporated with Limited Liability under the Joint-Stock Companies Acts, 1862 *and* 1867.

CAPITAL, £120,000, IN 12,000 SHARES OF £10 EACH.

£1 PAYABLE ON APPLICATION, AND £1 10s. ON ALLOTMENT.

DIRECTORS.

GEORGE CHARLES FRAMES, 55, Belsize Park, London.
FRITZ HILLE, C.E., Brentford.
Colonel T. W. MARTEN, Junior United Service Club.
SAMUEL SAUNDERS, Director of the Mutual Society.
Lieut.-Colonel THURBURN, Director of the Crédit Foncier of Mauritius.

BANKERS—ALLIANCE BANK, Bartholomew Lane, London.
SOLICITORS—ARGLES & RAWLINS, 85, Gracechurch Street, London.
BROKERS—HOLDERNESS, NOTT, & CO., St. Michael's Alley, Cornhill, London.
AUDITORS—RANSFORD & POTTER, Finsbury Circus, London.
SECRETARY—(*pro tem.*) MILTON BRADFORD.

TEMPORARY OFFICES—85, GRACECHURCH STREET, LONDON.

ABRIDGED PROSPECTUS.

This Company is established for the purpose of purchasing "Hille's English and Foreign Patents," and working and introducing Hille's system of disinfecting and utilizing Sewage.

No question of the present day is so universally important as the treatment of Sewage, and the purification of the effluent water.

Unless manure obtained from any process of defecation reaches a certain standard of chemical strength, it will not pay commercially.

Unless the effluent water attains the standard of purity fixed by the Rivers Pollution Commissioners or by the Thames Conservancy, no water will be allowed to flow into rivers.

These are the all-important points to be kept in view, and both these ends have been successfully attained, according to the accompanying chemical analyses and statement of the patentee, by the process pursued by Mr. Hille, whose system can be seen in operation at Wimbledon, where it has been practically tested during the last twelve months (see letter of the Surveyor of Wimbledon accompanying).

The distinguishing features of Hille's process are—

1. Instantaneous deodorization and uninterrupted precipitation.
2. Purity of the effluent water; see Dr. Letheby's analyses, which state:—"These results show that the defecation of the Sewage has been very complete, *and that the effluent water is sufficiently pure to be admissible into any running stream, without causing the slightest offence.*
3. Great commercial value of the residuum as manure, *the ammonia being largely retained in the precipitate, and the manure being rich in phosphates;* see Dr. Letheby and Professor Voelcker's analyses and valuations.
4. Cheapness and simplicity of the process, which render it generally applicable, whether to the largest or smallest towns and villages; and, finally, the profit to be derived from the sale of the disinfecting compound.
5. By reference to the statement of the patentee, it will be observed that by his final process all perceptible traces of ammonia can be removed from the effluent water.

It is claimed for Hille's process that the results in a sanitary as well as a commercial point of view are placed beyond question, that it is at once the most efficient and the cheapest known, and that the returns upon capital invested in its employment promise to be most remunerative; as the Company will derive revenue from the following sources:—

1. From the granting of licences to towns and villages for its use, and the sale of the chemicals and the disinfecting compound.
2. The value of the residuum as manure, which may be estimated as follows:—Taking a town of 10,000 inhabitants, and calculating 30 gallons of Sewage per head per day (an average quantity,) there would be 300,000 gallons of Sewage, from which, by the application of Hille's process, 1½ tons of good commercial manure would be obtained. The precipitate left in the deposit-tanks by means of the disinfecting compound being worth, as per analysis No. 2, about £1 6s. per ton, but when mixed with other chemicals (described in one of the patents transferred to this Company) used in Hille's system, costing from 10s. to 15s. per ton, a valuable and saleable manure is produced, which finds a ready market at £3 to £4 per ton, being equal to 300 per cent. and more upon the original cost.

In order to secure these valuable patents, the Directors have entered into an agreement for the purchase thereof, upon the following terms:—"That the Company shall acquire the English patents and the right to all foreign patents and improvements, for the following considerations: As regards the English patents, of paying to the vendor £12,000 in cash, out of which all preliminary expenses up to the allotment of shares are to be paid, and after a dividend at the rate of 10 per cent. per annum shall have been paid to the shareholders upon all capital paid up, the balance of net profit shall be divided between Mr. Hille and the Company, in the proportion of one-third to Mr. Hille and two-thirds to the shareholders; and as regards foreign patents, that the present Company shall be at liberty to obtain, sell, and transfer them to any other parties, upon paying to the vendors one-third of the price received, retaining two-thirds thereof for the benefit of the Company; by this it will be seen that the Company pays nothing whatever for the foreign patents until it shall have effected a sale of them.

Mr. Hille's statement respecting his patents accompanies this prospectus.

Prospectuses and forms of application for shares may be had at the Temporary Offices of the Company, and at the Brokers, Bankers, and Solicitors.

Should no allotment of shares be made, the deposit-money will be returned in full to the applicant.

Copies of the Analyses and Report of the Patentee can be obtained at the Office.

The following contract has been entered into:—

Date, Feb. 19, 1872.

Parties.—Between Fritz Hille, of Brentford, Middlesex, Civil Engineer, of the one part, and Milton Bradford, as Trustee for an intended Company, to be called the Sewage Disinfecting and Manure Company, Limited, of the other part.

SYSTEM F. HILLE.

Surveyor's Office, Wimbledon, Jan. 31, 1872.

Dear Sir,—I have much pleasure in bearing my testimony to the great efficiency of your system of dealing with the sewage of towns, and from the experience I have had in the practical working of the process during the last twelve months at Wimbledon, based upon a twenty years experience of the subject, and the full acquaintance of all existing means of purifying sewage, I am convinced that your process is the cheapest and most effective of all.

I take this opportunity of saying that the samples of sewage referred to in the analyses of Dr. Letheby, dated respectively Sept. 20, 1871, and Nov. 9, 1871, were taken in my presence, and upon the days mentioned.

I am, dear Sir, yours faithfully,
W. F. ROWELL.

To F. Hille, Esq.

FORM OF APPLICATION FOR SHARES.

(To be retained by the Bankers.)

No.....

To the Directors of "THE SEWAGE DISINFECTING AND MANURE COMPANY, LIMITED (HILLE'S SYSTEM)."

Gentlemen,—Having paid to your Bankers the sum of £ being a deposit of £1 per share on shares in the above company, I hereby request that you will allot me that number, and I agree to become a member of the Company in respect of such shares, or in respect of any less number you may allot me; and to pay on allotment the further deposit of £1 10s. per share thereon, and I request that my name may be placed on the register of members for the shares so allotted.

Name in full .....
Residence .....
Profession or Business .....
Date .....

TROTTER, HAINES, & CORBETT,

BRETTELL'S ESTATE

FIRE CLAY & BRICK WORKS,

STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICK.

Proprietors of

BEST GLASS-HOUSE POT and CRUCIBLE CLAYS.

Successors to

E. BAKER AND CO., LATE BRIERLEY HILL, STAFFORDSHIRE.

PRICE'S PATENT COKE & COAL BARROW,

effecting a great saving of time, labour, and expense.

For particulars, price, &c., apply to Mr. E. PRICE, Inventor and Patentee, Gas-Works, Hampton Wick, MIDDLESEX.

THOMAS LAMBERT & SONS,

SHORT STREET, LAMBETH, LONDON

PATENTEES OF THE

HIGH-PRESSURE EQUILIBRIUM BALL VALVES AND DIAPHRAGM BIB & STOP VALVES,

MANUFACTURE EVERY DESCRIPTION OF

GAS-JOINTS, CHANDELIERS, PENDANTS, BRACKETS, ETC.;

WROUGHT-IRON WELDED TUBE AND FITTINGS,

BLACK AND GALVANIZED;

BRASS, COPPER, LEAD, TIN, AND COMPOSITION TUBING,

STOCKS, TAPS, AND DIES,

And Every Description of Gas-Fitters Tools;

IRON MAIN COCKS, WITH WHITE METAL PLUGS;

GAS SLIDE AND SLUICE VALVES;

CARTER'S SAFETY GAS-VALVES;

GAS-STOVES, REGULATORS, BURNERS, &c.,

Pattern-Book and Price List of Gas-Fittings, supplied on application.

JAMES NEWTON & SONS,

(Established 1820,)

FIRE-BRICK AND TILE MERCHANTS,

Wholesale and for Exportation,

FALCON DOCK, 78 AND 79, BANKSIDE,

SOUTHWARK, LONDON, S.E.,

DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for

GAS AND WATER WORKS.

WALTER MABON & CO.,

Engineers,

ARDWICK IRON-WORKS,

FAIRFIELD STREET, MANCHESTER,

MANUFACTURERS OF

IRON TANKS, GASHOLDERS, GAS APPARATUS, PIPES, VALVES, IRON ROOFS, WROUGHT AND CAST IRON GIRDERS.

DESIGNS, SPECIFICATIONS, & ESTIMATES FURNISHED.

HOPKINS, GILKES, & CO.,

LIMITED,

MIDDLESBOROUGH,

SUPPLY GAS & WATER PIPES of EVERY SIZE.

Plain, Turned and Bored, and Coated.

CAST-IRON RETORTS.

Castings for Gas-Works of every description.

EXHAUSTERS.

LONDON OFFICE: 25, LAURENCE POUNTNEY LANE.

The BEST FIRE-BRICKS

Exported from the Tyne are branded ROBSON.

Apply to W. C. GIBSON, 43, Side, NEWCASTLE-ON-TYNE.

The CHEAPEST FIRE-BRICKS

Exported from the Tyne are branded ROBSON.

Apply to W. C. GIBSON, 43, Side, NEWCASTLE-ON-TYNE.

THOMAS CARR & SON,

MANUFACTURERS OF

FIRE-BRICKS, LUMPS, TILES, RETORTS, &c., &c.,

SCOTSWOOD FIRE-BRICK WORKS,

NEAR

BLAYDON-ON-TYNE.

SAM. CUTLER & SONS,

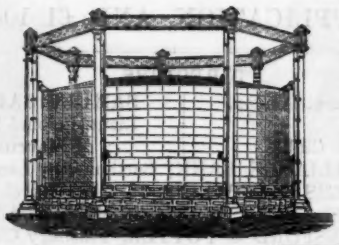
CONTRACTING GAS ENGINEERS,

GASHOLDER & GENERAL GAS APPARATUS MAKERS,

MANUFACTURERS OF

BOILERS, IRON ROOFING, IRON BRIDGES,

AND GENERAL IRONWORK.



S. C. AND SONS undertake Contracts of any magnitude for the **Erection of new and Remodelling of existing Gas-Works**, for **Gasholders, Cast and Wrought Iron Tanks, Iron Roofs**, and every description of **Apparatus** for the Manufacture and Distribution of Gas.

Special attention is invited to their **"Improved Condenser,"** which is very effective, and much approved; also to their patterns of **Annular** and other **Condensers, Scrubbers**, and **Purifiers**, of all sizes, which they arrange either with **Centre** or Ordinary **Slide Valves.**

WORKS FOR THE SUPPLY OF

VILLAGES, MANSIONS, FACTORIES, &c.

S. C. AND SONS undertake the **Supply** and **Laying** of **Mains** for **Gas and Water**, and supply all Castings, Connexions, and Fittings for Retort-House, Works generally, and for Streets. They also supply **Valves** of all descriptions, Iron and Clay Retorts, Hotpressed Retort-Lids, Steel Charging-Scoops of improved make, for which they have special machinery, Improved Coke and Coal Barrows, Cross-Bars and Screws, Bolts and Nuts, Furnace and Stoking Tools, Iron and Wood Purifier-Sieves, Lead, Yarn, Borings, &c., including every requisite whatsoever for a Gas-Work, a well-assorted stock being kept of those goods most in request.

SOLE MAKERS OF BRETT'S PATENT COKE BARROW.

Experienced Retort Setters sent to any part of the Kingdom.

Address: PROVIDENCE IRON-WORKS, MILLWALL, LONDON.

JOHN WRIGHT & CO.,

30, BROAD STREET, ISLINGTON, BIRMINGHAM.

MANUFACTURERS TO THE TRADE

OF EVERY DESCRIPTION OF

GAS-STOVE FOR HEATING OR COOKING,

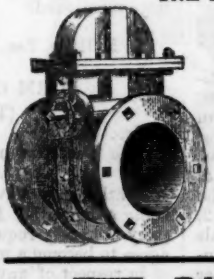
GAS-BURNERS, OPAL REFLECTORS, SMOKE CONSUMERS, &c.

ROUND AND SQUARE GAS COOKING STOVES
GAS STOVES OF EVERY DESCRIPTION
VESTIBULE LAMP FROM 20/ UPWARDS
SMOKE CONSUMER
GAS BROILER AND HOT PLATE
GREEN & WHITE OPAL REFLECTOR

Pattern-Books, with Prices and Discounts, sent free on application.

B. DONKIN & CO.'S

IMPROVED GAS-VALVES



WITH WROUGHT-IRON PINIONS,

From 2 inches to 18 inches, price 10s. 6d. to 13s. 6d. per inch diameter.

List of prices, with full dimensions of all sizes up to 48-inch, to be had on application.

These Valves are all proved on both sides to 30 lbs. on the square inch before leaving the works, and are always kept in stock.

VALVES MADE WITH OUTSIDE RACKS TO ORDER.

ALSO,

SCREW WATER-VALVES WITH GUN-METAL FACES.

B. DONKIN & CO.,

GENERAL ENGINEERS AND IRONFOUNDERS,

MAKERS OF STEAM-ENGINES,

BLUE ANCHOR ROAD, BERMONDSEY,

LONDON, S.E.

THE PATENT RIBBED GAS-RETORTS

Are in Use at over 150 Gas-Works,

And continue to give entire satisfaction. Circulars, with prices and testimonials, will be sent on application to

A. C. FRASER, GAS-WORKS, MIDDLESBROUGH.

F. & C. OSLER,

45, OXFORD STREET, LONDON, W.

MANUFACTORY AND SHOW-ROOMS:

BROAD STREET, BIRMINGHAM.

ESTABLISHED 1807.

MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS,

WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.

TABLE GLASS OF ALL KINDS.

CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.

WALTER FORD,

159, GRAY'S INN ROAD, LONDON,

MANUFACTURER OF

WET & DRY GAS-METERS, STATION-METERS, GOVERNORS, &c.

ALSO OF

PATENT STREET-LAMP REGULATORS,

FOR ENSURING ANY REQUIRED CONSUMPTION.

These Regulators are in general and increasing use, and references can be given to Gas Companies who for many years have used them for every Lamp.

GEORGE ANDERSON,

GAS AND CONSULTING ENGINEER,

19, NORTHUMBERLAND STREET, STRAND, W.C.

MR. ANDERSON advises Companies on all matters connected with the manufacture of Gas and the construction of Works.

PATENTEE and MANUFACTURER of the following Inventions:—

RETORT SETTINGS, heated by tar without the production of smoke.
STEAM-ENGINES and EXHAUSTERS, separately or combined.
FOUR-WAY VALVES, one of which is equal to three ordinary Valves.
STATION GOVERNORS—the Gasholder cannot tilt and cause accident.

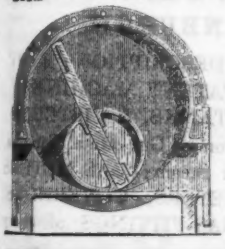
BREEZE AND TAR FUEL MACHINE.

A Pamphlet containing Eighteen Illustrations of the foregoing, with letterpress on the construction of Works, post free, 2s. 6d.

N.B.—The second edition of this Work, *now ready*, contains illustrations of the Machine for converting Breeze and Tar into Fuel for heating the Retorts.

"The Author is well qualified to speak authoritatively upon the important subjects to which his pamphlet refers."—*Artizan.*

J. BEALE'S PATENT GAS EXHAUSTER.



BEALE'S CONTINUOUSLY ACTING

GAS EXHAUSTERS

ARE NOW MANUFACTURED BY

B. DONKIN & CO.

MR. J. BEALE, of East Greenwich, having retired from business, has made an arrangement with B. DONKIN & CO. for the sole manufacture of his Patent Solid-Slide Gas Exhausters.

B. D. & Co. also make Steam-Engines to drive Gas Exhausters direct or otherwise.

Estimates and Prices on application to

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TO GAS COMPANIES AND THE TRADE.

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MANUFACTURERS OF

CRYSTAL, BRONZED, & ORMOLU CHANDELIERS, IMPROVED CRYSTAL STAR & SUN LIGHTS, AND THE PATENT CRYSTAL ILLUMINATION;

Vestibules, Iron Barrel, Composition Tubing, Dry & Wet Meters, & Gas-Fittings OF EVERY DESCRIPTION.

WORKS: LONDON, BIRMINGHAM, & PARIS.

REGISTERED DESIGNS.

Special Designs prepared in perfect accordance with architectural arrangements. Estimates furnished for the Lighting and Fitting up of Theatres, Music Halls, and Public or Private Building with Gas.

GAS MOONS of the newest designs.

The Patent Gas-Regulator and Purifier reduced to 6s. 6d. per Doz.

Pattern-Books of Gas-Fittings, Crystal and Ormolu Chandeliers for 1870, are now complete.

City Show-Rooms and Manufactory, 147, HOUNDSDITCH, LONDON.

ESTABLISHED 1805.

SCOTCH CANNEL COALS.

The Subscriber is prepared to contract for the supply of all the principal SCOTCH CANNEL COALS. Prices and Analyses of the various Coals will be forwarded on application.

JAMES M'KELVIE,

CANNEL COAL MERCHANT,

HAYMARKET, EDINBURGH.

Established 1840.

INCE HALL CANNEL COAL.

LEE & JERDEIN,

COAL OWNERS AND MERCHANTS,

Sole Vendors of the Ince Hall Wigan Coal and Cannel.

Chief Office:

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LOCHORE CANNEL COALS.

	Quantity C. Ft.	Quality Cand.	Sulphur. Per ct.	Sperm value. lbs.	Volatile matter. Per ct.	Ash Per ct.
Lochore seam	11,351	37·06	0·33	1414	52	12
or.....	12,000	34				
Waverley seam	11,000	31	0·41	1169	47	17

The valuable qualities of these Coals are the very high illuminating power, the large yield, and *great freedom from sulphur*.

Detailed analysis, &c., on application to R. B. SYMINGTON, Lochore Colliery, by DUNFERMLINE; or to ROBERT MARSHALL, 38, Commercial Street, LEITH.

POPE & PEARSON'S GAS COAL.—We have now the authority of several of the most eminent Gas Engineers of London in stating that our Coal yields in *practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.

One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

For further particulars, apply to POPE AND PEARSON, West Riding and Silkstone Collieries, near LEEDS.

OLD WEMYSS CANNEL COAL.—Yield of gas per ton, 12,886 cubic feet; illuminating power, 31·75 standard candles. Port of shipment, Wemyss.

Analysis and price on application to Mr. WM. CARNEY, Manager, Wemyss Colliery, Kirkcaldy, FIFE.

THE

HUCKNALL COLLIERY COMPANY

Can offer a CANNEL COAL yielding a large quantity of Gas of superior quality.

Prices and information on application to the HUCKNALL COLLIERY COMPANY, Hucknall Torkard Collieries, near NOTTINGHAM.

CANNEL COAL.

COPPA COLLIERY, MOLD,

Beg leave to call the attention of Gas Companies to the superior quality of their

CANNEL FOR GAS-MAKING PURPOSES

This Cannel produces in actual working, in iron retorts, 9200 cubic feet of 32-candle gas, and upwards of 11 cwt. of coke, and in clay retorts will produce 11,500 cubic feet of 25·9-candle gas.

Ports of shipment—Birkenhead or Connah's Quay.

Waggons supplied for delivery by railway to any part England or Wales.

For particulars, prices, and rates of freight, apply to The Coppa Colliery, Mold, FLINTSHIRE.

DYKEHEAD CANNEL.

SHIPPED AT GLASGOW, GREENOCK, GRANGEMOUTH, GRATON, or LEITH.

Analysis—10,000 feet of 24-candle Gas, 10½ cwt. Coke. Ash in Coke, 15 per cent.

Address: DYKEHEAD COLLIERY COMPANY, STIRLING, N.B.

FIRE-CLAY GAS-RETORTS, &c., CANNEL AND STEAM COALS.

WILLIAM FRASER, Inverkeithing (owner of the Works at which Fire-Clay Retorts were first made), having greatly enlarged his Works, can supply RETORTS and other FIRE-CLAY GOODS to any extent.

References can be given to managers of above a hundred Gas-Works whom he supplies.

WILLIAM FRASER ships COWDENBEATH PARROT COALS at Charlestown and Burntisland at 11s. per ton; and HALBEATH STEAM COALS, on Navy List, at 7s. per ton.

ROBERT MACLAREN and CO., EGLINTON FOUNDRY, GLASGOW,

Manufacturers of all sizes of Cast-Iron Main-Pipes by an improved Patent, General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

ADDISON POTTER, WILLINGTON QUAY, NEAR NEWCASTLE-UPON-TYNE,

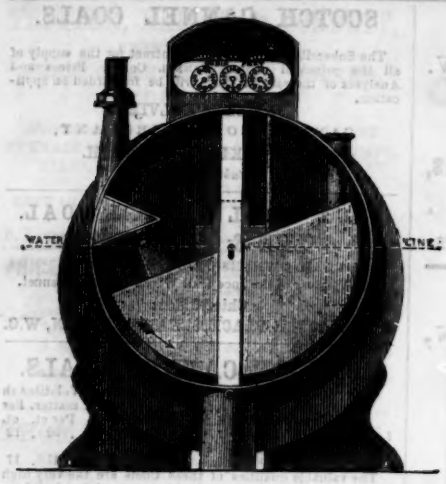
Manufacturer of Clay Retorts, Fire-Bricks and every description of Fire-Clay Goods.

BIRTLEY IRON WORKS, CHESTER-LE-STREET, DURHAM.

Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.

Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

Agent in London, Mr. J. MANWARING, 101, Cannon Street, E.C.



THE

UNVARYING WATER-LINE GAS-METER.

(SANDERS AND DONOVAN'S PATENT.)

"Unquestionably the best Water Gas-Meter now in use."

Over 60,000 in action.

MANUFACTURERS:

THE GAS-METER COMPANY,

KINGSLAND ROAD, LONDON;

WITH

Branch Manufactories at DUBLIN and OLDHAM.

ALEXANDER WRIGHT & CO.,

MANUFACTURERS OF

"WET" & "DRY" GAS-METERS

of the highest excellence.

STATION-METERS AND GOVERNORS.

STREET-LAMP REGULATORS.

TESTING APPARATUS

of the most perfect description for all purposes relating to Gas.

Just published, HANDBOOKS by F. W. HARTLEY:—

"PHOTOMETRY," 2s. 1d., post paid; "THE ESTIMATION OF AMMONIA AND SULPHUR IN GAS," 2s. 1d., post paid; "GAS-METER TESTING UNDER THE SALES OF GAS ACT," &c. (Second edition, revised and extended), 1s. 1d., post paid.

55 and 55A, MILLBANK STREET, WESTMINSTER, S.W.

LAIDLAW'S PATENT GAS EXHAUSTER.

R. LAIDLAW & SON,

GAS ENGINEERS, CONTRACTORS, IRON & BRASS FOUNDERS,

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